SOCIETY OF AMERICAN FORESTERS 1900

# Journal of FORESTRY

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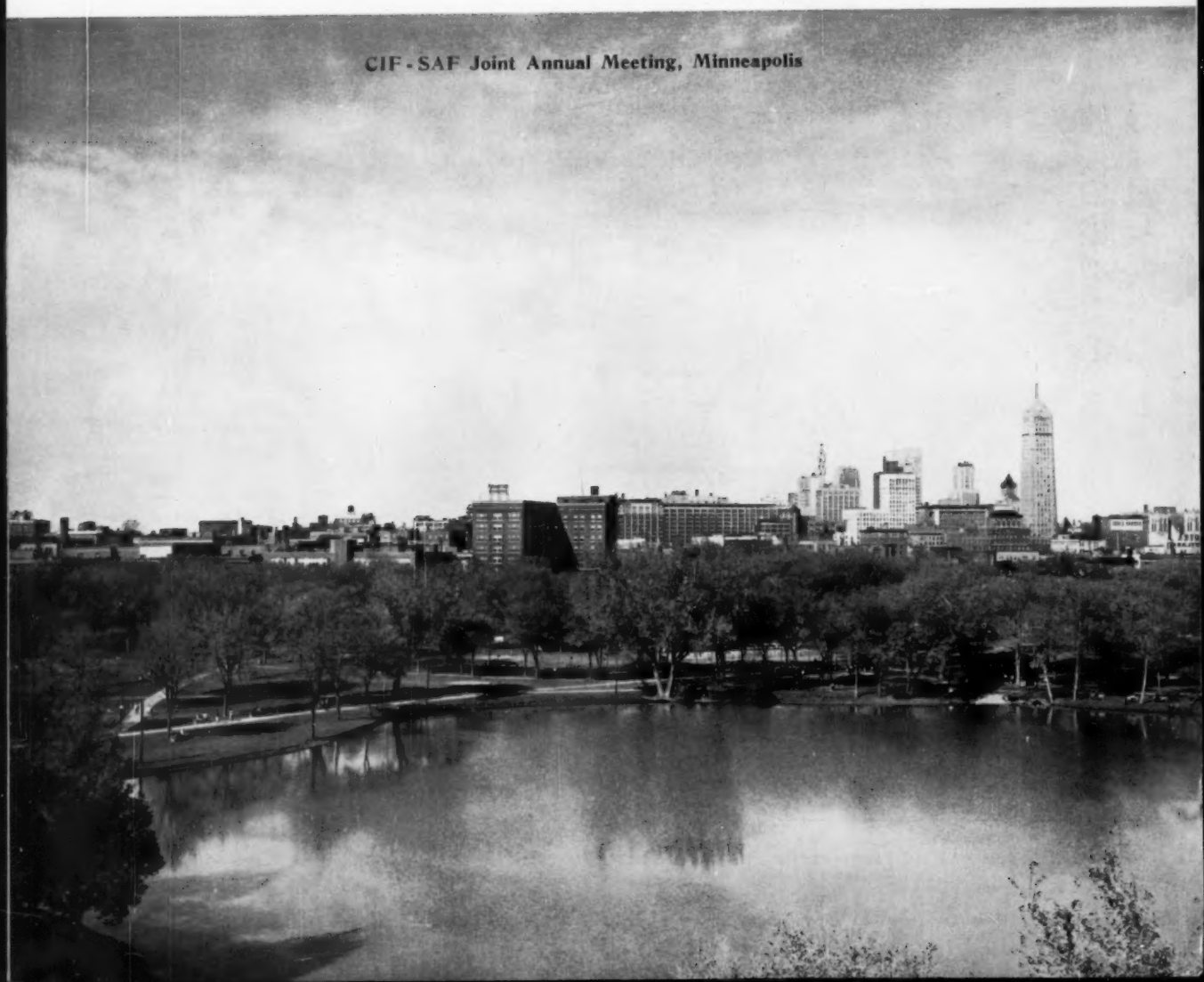
Volume 59
Number 9



CIF - SAF Joint Annual Meeting, Minneapolis

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VOLUME 59
NUMBER 9

# Journal of Forestry

SEPTEMBER 1961

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*Photo courtesy Minneapolis Chamber of Commerce*

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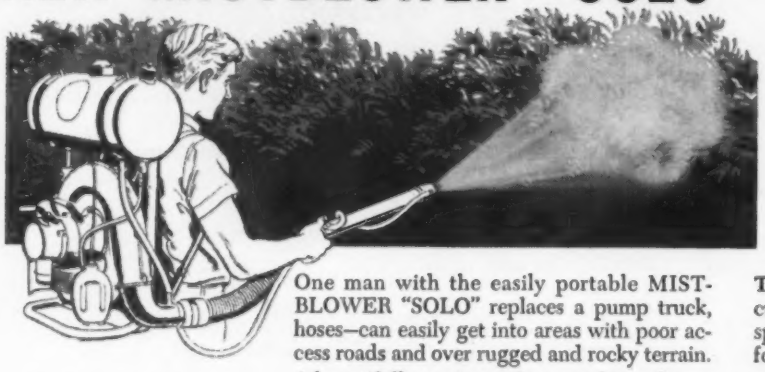

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In news columns and editorials he hammers home his theme. From Grays Harbor his message races through the land. His editorials are widely reprinted. Later he joins the staff of the American Forest Products Industries, promoting tree farming nationally.

**Now it is 1961.** Back at his own newspaper, he can reflect upon his many services. But none surpasses the millions of acres of new forests he helped create.

In this the 20th anniversary year of tree farming, we think it appropriate to call attention to *Chapin Collins*—editor, publisher, public servant and *Mr. Tree Farm.*

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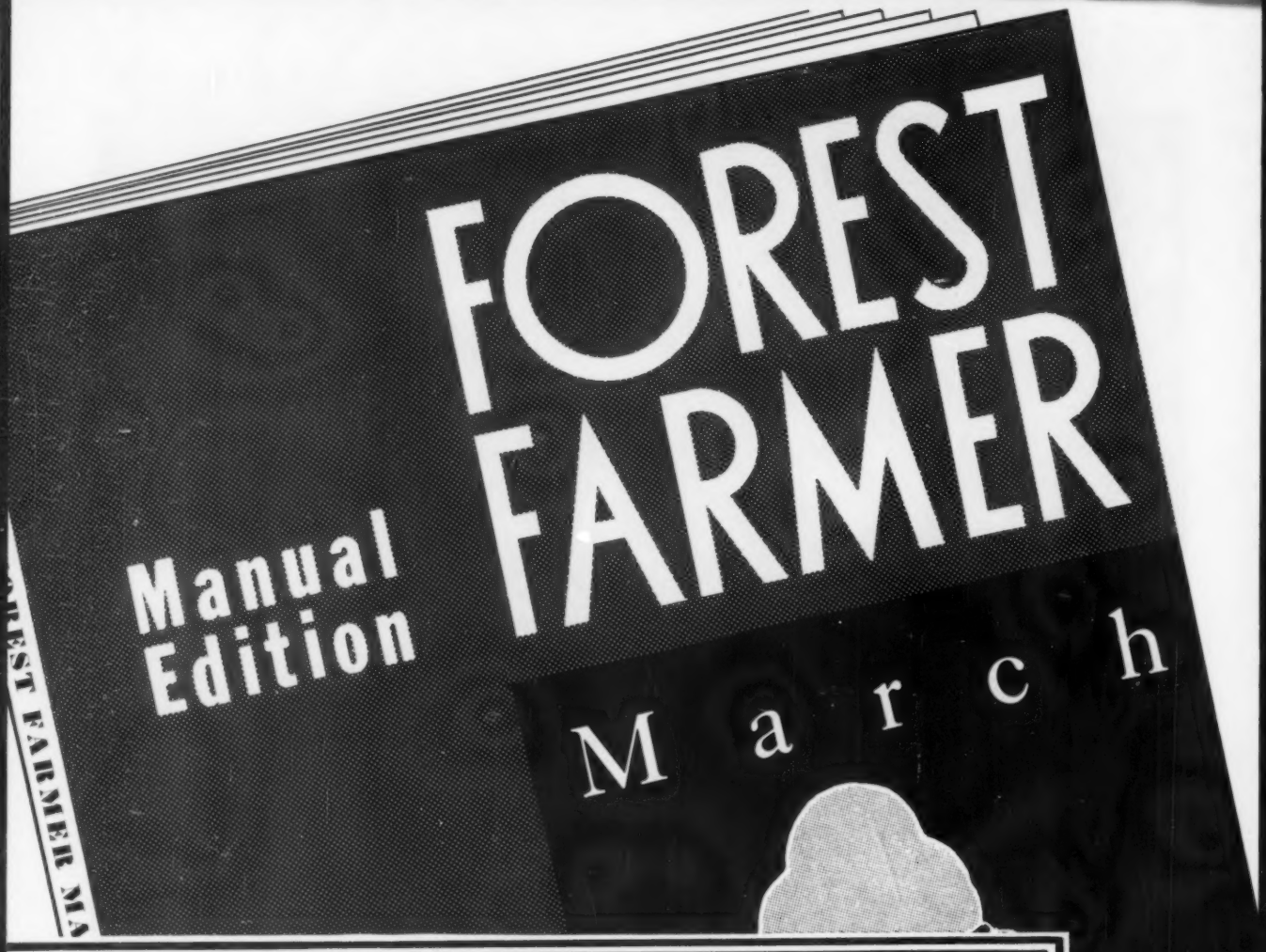


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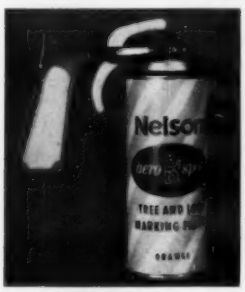


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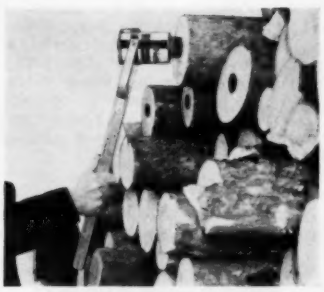

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# BUCK MARTIN 4652

## SYMBOLIC FORESTER OF THE FUTURE

Friends, Buck has previously been introduced to regional audiences in the Southeastern United States. Some of his bold predictions of the future have become reality. Others may. Buck may be the clairvoyant whose vision will headlight the pathway to tomorrow's forestry. If you challenge, disagree or approve of Buck's forecasts, he would very much appreciate your writing him at Box 8397, Jackson, Mississippi. Now, Buck, what predictions of yours have come true?

BUCK: In 1960 I foresaw foresters traveling in air-cars, without wheels, through compartmented woods along prepared lanes. Such a car is now available. I predicted dehydrated beer – you can buy it now. A predicted satellite communications system is being made ready.
JWC: *Very good, Buck, what next?*
BUCK: Well, first you had better stop calling me just Buck and get accustomed to the whole "Buck Martin 4652". It's going to take it to identify me.
JWC: *OK, but why the 4652?*
BUCK: They are the last four digits on my Social Security number. The "brains" that keep track of people these days can't think with anything but numbers.
JWC: *I still want to know what you see next.*
BUCK: I see more emphasis on modern forestry tools that permit more work in less time. Increasing costs will pressure foresters into greater production.
JWC: *That's too general. Stick out your neck on something specific, so the boys can start picking it to pieces.*
BUCK: All right, I'll predict that within 10 years foresters will be growing extensive stands of pedigreed trees, developed from improved genetic strains. These trees will perform best when they alone (except for grasses and herbs) occupy the land. This will make mandatory the control or elimination of all other vegetation. My fellow foresters and I will be needing some fresh new herbicides to help us grow the necessary wood under those conditions.
JWC: *Yes, Buck, undoubtedly you will. Now what do you see ahead in fire control?*
BUCK: I think that fire detection and control will become far more of a team effort than it is today. I anticipate a joint industry-state-federal shoulder-to-shoulder effort. Likely there will be a network of tall sky probers, unmanned, each topped with a sensitive infra-red heat-sensing device. This device will feed information on all fires—forest, field, home, any heat source—into a central analyzer room and control headquarters. There electronic brains will instantaneously sort out heats from known sources and trigger warnings on new ones.
JWC: *Sounds great, but what about extinguishment?*
BUCK: There will be quenching action from the air and from the ground. Quenching will involve robbing the fire of heat, by using concentrated heat-absorbing materials to lower the temperature below ignition point. The effect will be miraculous. Combustion will almost instantly cease. Talking about combustion, I'm pretty hot myself. This going-into-the-future business creates a lot of friction. Let's go dip an ice bar into some dehydrated beer and cool off.
JWC: *OK, Buck, but later we will be expecting more predictions from you.*

Buck Martin 4652 may be you a few years hence. Maybe you would like to express yourself to Buck. He would like to hear from you. Address him at Box 8397, Jackson, Mississippi. Thank you.

James W. Craig, President

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Journal of Forestry

Official Organ of the Society of American Foresters

# Combined Annual Meeting
## Canadian Institute of Forestry and Society of American Foresters
**Minneapolis, Minn., October 8-11, 1961**

CHARLES A. CONNAUGHTON
PRESIDENT SAF

"Forestry's Common Frontiers" is the theme for the international meeting of professional foresters in Minneapolis, October 8-11. This will be a joint meeting of the Society of American Foresters and the Canadian Institute of Forestry. About 1,000 members and wives are expected to attend.

A general session and ten technical sessions are scheduled covering all fields of forestry practice. About 70 scientific and professional papers will be read.

This meeting provides an opportunity for foresters from the United States and Canada to exchange ideas and discuss progress in forest administration, research, and education. All friends of forestry are welcome whether or not they are members of the two professional societies.

The re-emerging forests of the Upper Great Lakes area, with their large areas under scientific management, will be the topic of many papers. Others will deal with forestry problems and plans throughout North America. Post-meeting tours are arranged to see interesting forestry activities in the Lake States.

### Ladies Activities

A special lounge will be available as hospitality headquarters for ladies throughout the meeting. There will be special hostesses for all activities.

Registration of ladies will open on Sunday afternoon, October 8, and continue into the evening. There will be an afternoon tea.

On Monday morning, October 9, there will be a kaffee-klatsch. The afternoon is for shopping and excursions. The following have been arranged:

Southdale, the Twin Cities shopping center, surrounding a covered plaza.

Midwest Furniture showrooms, featuring an interesting display of home furnishings.

Contemporary and traditional furniture showrooms; unusual furniture including designs from Paul McCobb.

Dayton's Department Store and informal modeling in Dayton's Skyroom restaurant.

Tuesday, October 10, is Tour Day. Ladies will have the choice of three tours, all by bus, as follows:

1. Ann Pillsbury Kitchens, the Planetarium, lunch in the Waikiki Room, and the American Swedish Institute; Minneapolis.

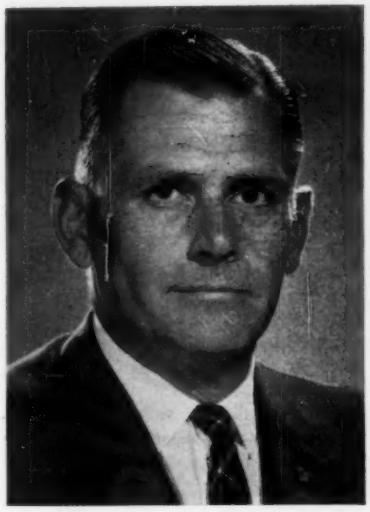
2. American Swedish Institute, lunch at Fair Oaks, and the Minneapolis Institute of Arts or the Historical Society; Minneapolis.

3. Ford Assembly plant, lunch at Coleman's, the Sibley House, and the State Capitol; St. Paul.

On Tuesday evening, the ladies are invited to attend the smorgasbord and social evening.

Wednesday, October 11, will feature a luncheon at the Interlachen Country Club, preceded by a social hour and followed by the noted entertainer of the Midwest, Mrs. Carol Seagren. Transportation will be by bus; the trip will go and return through the parks and lake district of Minneapolis.

On Wednesday evening there will be a social hour and the joint annual CIF-SAF dinner.



LOWELL BESLEY
PRESIDENT CIF

### General Meeting

**Monday morning, October 9**
Carl H. Stoltenberg, Chairman
Theme: "Forestry's Common Frontiers"

1. Welcome by Charles A. Connaughton, president of the Society of American Foresters.

2. Response by Lowell Besley, president of the Canadian Institute of Forestry.

3. "Forestry—Between Past and Future." Harry S. Mosebrook, Weyerhaeuser Company, New York, N. Y.

4. "Forestry Perspectives." J. W. B. Sisam, Faculty of Forestry, University of Toronto, Toronto, Ont.

### Society Affairs Session
**Monday afternoon, October 9**

Charles A. Connaughton, President
Henry J. Malsberger, Vice President

Henry Clepper, Executive Secretary

1. Report of the President.
2. Report of the Executive Secretary.
3. Report of the Editor of Society publications, Arthur B. Meyer.
4. Report of the Editor of *Forest Science*, John W. Duffield.
5. Report of the Committee for the Advancement of Forestry Education, Frank H. Kaufert.
6. Report of the Planning Committee, Lee M. James.
7. Report of the Committee on International Relations, V. L. Harper.
8. Report of the Committee for the Study of Education, Henry J. Vaux.
9. Report of the Committee on Forestry Research, George M. Jemison.

### Special Program on the Recreational Demands on Forests

**Monday afternoon, October 9**

William C. Bramble, Chairman

1. "The Establishment of Wilderness Areas by Congressional Legislation."

In support. Frank W. Lara, National Wildlife Federation, Washington, D. C.

In opposition. H. R. Glascock, Jr., Western Forestry and Conservation Association, Portland, Ore.

2. Discussion of this and other issues to follow. Audience participation is especially invited.

### CIF Business Meeting

**Monday afternoon, October 9**

Lowell Besley, President
H. J. Hodgins, Past President
J. J. E. Dosne, Secretary-Manager

Agenda to be announced later.

### Technical Session on Forest Management

**Tuesday morning, October 10**

Frank D. Irving, Chairman (SAF)

Symposium: Management Plans—The Path to the Future

F. S. McKinnon, Moderator (CIF)

1. "Government Working Plans in Eastern Canada." Murray Morison, Ontario Department of Lands and Forests, Toronto, Ont.
2. "The Company Forester's Viewpoint." Alan Moss, S. M. Simpson Ltd., Kelowna, B. C.
3. "Timber Management Planning on the National Forests." Donald J. Morriss, U. S. Forest Service, Washington, D. C.
4. "Some Examples of Industrial Forest Management Planning in the Southeastern United States." Donald D. Stevenson, The Buckeye Cellulose Corporation, Foley, Fla.

**Tuesday afternoon, October 10**

Richard L. Knox, Chairman (SAF)

1. "Recent Trends in Forest Photogrammetry." T. E. Avery, Department of Forestry, Michigan State University, East Lansing, Mich.
2. "Aerial Survey Techniques for the Spruce Budworm in the Lake States." Robert C. Heller, U. S. Forest Service, Washington, D. C., and Donald C. Schmiege, Lake States Forest Experiment Station, St. Paul, Minn.
3. "A Proposed Sampling Design for Extensive Forest Inventory: Double Sampling for Regression with Multiple Random Starts." Cherng Jiann Shiue (deceased) and Hugo H. John, School of Forestry, University of Minnesota, St. Paul, Minn.
4. "Swamp Drainage in European Forest Management." Joseph H. Stoeckeler, Lake States Forest Experiment Station, St. Paul, Minn.
5. Election of officers for SAF Division of Forest Management.
6. Report of standing committees.

### Technical Session on Forest Recreation

**Tuesday morning, October 10**

Henry A. Harrison, Chairman (SAF)
A. B. Wheatley, Chairman (CIF)

1. "Recreation and Land Ownership." Kenneth B. Pomeroy, The American Forestry Association, Washington, D. C.
2. Panel Discussion: Forest Recreation Moves Ahead.

"State Public Lands." H. G. Wilm, New York Conservation Department, Albany, N. Y.

"Industrial Forest Lands." A. V. Smyth, Weyerhaeuser Company, North Bend, Ore.

"National Forests." Philip L. Heaton, U. S. Forest Service, Portland, Ore.

"National Parks." William L. Bowen, National Park Service, Washington, D. C.

"Forest Recreation Moves Ahead in Ontario." A. B. Wheattley, Ontario Department of Lands and Forests, Toronto, Ont.

3. Business meeting of SAF Division of Forest Recreation.

### Technical Session on Forest-Wildlife Management

**Tuesday morning, October 10**

James P. Gilligan, Chairman (SAF)
A. T. Cringan, Chairman (CIF)

Program not received.

### Technical Session on Education

**Tuesday afternoon, October 10**

K. G. Fensom, Chairman (CIF)
John Carow, Chairman (SAF)

Topic: Some Canadian and American Points of View on Current Problems of Forestry Education.

1. "Canadian Experience with the Five-Year Undergraduate Forestry Curriculum." John W. Ker, Faculty of Forestry, University of New Brunswick, Fredericton, N. B.
2. "The Feasibility and Needs for a Five-Year Professional Degree Program in the United States." Ernest Wohletz, College of Forestry, University of Idaho, Moscow, Idaho.

Discussion.

3. "Forest Technicians in Canada." George S. Allen, Weyerhaeuser Co., Centralia, Wash.
4. "The Place of Technician Training in the United States." Archie E. Patterson, School of Forestry, University of Georgia, Athens, Ga.

Discussion.

### Schedule of Events

**Sunday, October 8**

SAF Council meeting: morning.
CIF Board meeting: afternoon and evening.
SAF Section delegates and Council closed meeting: afternoon.
Xi Sigma Pi meeting: afternoon.
JOURNAL OF FORESTRY editorial board conference: evening.
Association of Consulting Foresters open meeting: evening.
Extension Foresters meeting: evening.

**Monday, October 9**

General session: morning.
CIF business meeting: afternoon.
SAF Society Affairs session: afternoon.
Motion pictures: evening.
Alumni functions: evening.

**Tuesday, October 10**

Forest Management technical session: morning and afternoon.
Forest Recreation technical session: morning.
Forest-Wildlife Management technical session: morning.
Forestry Education technical session: afternoon.
Watershed Management technical session: afternoon.
Buffet dinner and social evening.

**Wednesday, October 11**

Silviculture technical session: morning and afternoon.
Forest Products technical session: morning.
Forest Economics and Policy technical session: morning.
Forest Fire technical session: morning and afternoon.
Range Management technical session: afternoon.
SAF Council meeting: afternoon.
Reception and social hour: evening.
Joint CIF-SAF annual dinner: evening.

Topic: Centennial of the Land Grant Colleges in the United States.

5. "Forestry Education in the Land Grant Colleges of the United States." Terrill D. Stevens, Department of Forestry, Michigan State University, East Lansing, Mich.

Discussion.

6. Business meeting of SAF Division of Education.

### Technical Session on Watershed Management
**Tuesday afternoon, October 10**

Paul J. Zinke, Chairman (SAF)
A. S. L. Barnes, Chairman (CIF)

1. "Challenges and Opportunities in Watershed Management in the Lake States." Sidney Weitzman, Lake States Forest Experiment Station, St. Paul, Minn.

2. "Watershed Management by the Eastern Rockies Forest Conservation Board." George Tunstell, Eastern Rockies Forest Conservation Board, Edmonton, Alta.

3. "Watershed Management in Ontario through Conservation Authorities." A. S. L. Barnes and D. N. McMullen, Ontario Department of Commerce and Development, Toronto, Ont.

4. "Forest-Snow Relationships." Bertram C. Goodell, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.

5. "Managing the Forest for Soil Moisture Control." Robert Zahner, School of Natural Resources, University of Michigan, Ann Arbor, Mich.

6. Business meeting of SAF Division of Watershed Management.

### Technical Session on Silviculture
**Wednesday morning and afternoon, October 11**

Paul O. Rudolf, Chairman (SAF)
David A. S. Dyer, Chairman (CIF)

1. "Site Conditions and Vegetation Patterns as Indicators of Prescribed Burning in Northern Coniferous Forests of Finland and America." Clifford E. Ahlgren, Quetico-Superior Wilderness Research Center, Ely, Minn.

2. "Use of Prescribed Fire in the Regeneration of Jack Pine." William R. Beaufait, Ford Forestry Center, Michigan College of Mining and Technology, L'Anse, Mich.

3. "Trial of a Photographic Technique to Count Cones." Donald T. Gordon, Pacific Southwest Forest and Range Experiment Station, Susanville, Calif.

4. "A Comparison of Growth of Four Northern Conifers under Long and Natural Photoperiod in Wisconsin and Florida." Richard F. Watt, Lake States Forest Experiment Station, St. Paul, Minn.

5. "Planting Hardwoods in the Southeastern Coastal Plain." Thomas Lotti, Southeastern Forest Experiment Station, Charleston, S. C.

6. Report of the Committee on Natural Areas. John F. Shanklin, Office of Assistant Secretary, U. S. Department of the Interior, Washington, D. C.

7. Report of the Committee on Forest Tree Improvement. Howard Kriebel, Ohio Agricultural Experiment Station, Wooster, Ohio.

8. Election of officers for SAF Division of Silviculture.

### Technical Session on Forest Fire
**Wednesday morning, October 11**

J. C. Macleod, Chairman (CIF)

1. "Goals and Organization of SAF Division of Forest Fire." J. S. Barrows, Intermountain Forest and Range Experiment Station, Division of Forest Fire Research, Missoula, Mont.

2. "Forest Fire Prevention—Progress and Prediction." Clare W. Hendee, U. S. Forest Service, Washington, D. C.

3. "An Industrial View of Forest Fire Control." W. B. Gayle, MacMillan, Bloedel and Powell River Company, Ltd., Vancouver, B. C.

4. "How Much Company Fire Protection on Company Lands?" O. G. Traczewitz, Woodlands Department, International Paper Company, Mobile, Ala.

5. "Some Applications of Radio in Forest Fire Control." R. Hook, Saskatchewan Department of Natural Resources, Prince Albert, Sask.

**Wednesday afternoon, October 11**

Carl C. Wilson, Chairman (SAF)

1. "Crown Fire Problems in the Lake States." John A. Beale, Wisconsin Conservation Department, Madison, Wis., and John H. Dieterich, Lake States Forest Experiment Station, St. Paul, Minn.

2. "Aircraft in Fire Control in Ontario." W. T. Foster, Ontario Department of Lands and Forests, Toronto, Ont.

3. "Applications of Fire Weather Service in Forest Fire Control." Dwight L. Phipps, Oregon State Board of Forestry, Salem, Ore.

4. "Crisis Periods and Fire Control Planning." Keith Arnold, Pacific Southwest Forest and Range Experiment Station, Berkeley, Calif.

5. Business meeting of SAF Division of Forest Fire and election of officers.

### Technical Session on Forest Products
**Wednesday morning, October 11**

Harvey D. Erickson, Chairman (SAF)
E. S. Fellows, Chairman (CIF)

1. "The Role of Analytical Studies in Improving Harvesting Operations and Forestry Practices." Thomas A. Walbridge, Jr., Hiwassee Land Company, Athens, Tenn.

2. "Significant Trends and Ideas in Timber Harvesting in Eastern Canada." L. R. Seheult, Faculty of Forestry, University of New Brunswick, Fredericton, N. B.

3. "Influence of Integration, Mergers, and Merchandising on Utilization of the Forest Crop." Bernard L. Orell, Weyerhaeuser Company, Tacoma, Wash.

4. "Everything but the Squeal." P. M. Morley, Consolidated Paper Corporation Ltd., Pembroke, Ont.

5. Motion picture. Canadian International Paper Company's pulpwood combine and full-tree skidder.

6. Business meeting of SAF Division of Forest Products.

### Technical Session on Forest Economics and Policy
**Wednesday morning, October 11**

Ronald I. Beazley, Chairman (SAF)
David A. Wilson, Chairman (CIF)
Topic: Forestry Related to Trade and Investment in Forest Products between the United States and Canada.

1. "The Development of Trade and Investment in Forest Products between the United States and Canada." W. S. Bromley, American Pulpwood Association, New York, N. Y.

2. "Foreign Trade in Forest Products from the Point of View of an Importing Country (the United States)." I. Irving Holland, Department of Forestry, University of Illinois, Urbana, Ill.

3. "Foreign Trade in Forest Products from the Point of View of an Exporting Country (Canada)." A. L. Best and H. M. Babcock, Canadian Department of Forestry, Ottawa, Ont.

4. "The Future of Trade and Investment in Forest Products between the United States and Canada." David V. Love, Faculty of Forestry, University of Toronto, Ont.

Discussion.

5. Business meeting of SAF Division of Forest Economics and Policy.

Election of officers.

Other business.

### Technical Session on Range Management
**Wednesday afternoon, October 11**

Charles Terwilliger, Jr., Chairman (SAF)
W. R. Hanson, Chairman (CIF)

1. "Ecology of Browse Management in Forest Types in the Cedar-Hemlock Zone." Walter F. Mueggler, Intermountain Forest and Range Experiment Station, Ogden, Utah.

G. W. I. CREIGHTON, TOASTMASTER

2. "Forage Resources of the Aspen Type and Problems of Management under Multiple Use." Odell Julander, Intermountain Forest and Range Experiment Station, Ogden, Utah.

3. "Possibilities of Type Conversion in Land Management in the Southwest." Elbert H. Reid, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.

4. "Determining Equitable Grazing Fees for Lands of the Washington State Department of Natural Resources." Grant Harris, Washington State University, Pullman, Wash.

5. "Game Range-Timber Management Relationships." Ray Dasmann, University of California, Berkeley, Calif.

### The CIF-SAF Dinner
**Wednesday evening, October 11**

Toastmaster, G. W. I. Creighton

Preceding the dinner there will be a reception and social hour.

Presentation of awards for achievement in biological research, SAF President Charles A. Connaughton;

For merit, George A. Garratt, member of the SAF Council.

Address. John H. Hinman, International Paper Company, New York, N. Y.

Music and dancing.

### Hotel Reservations

Those planning to attend the meeting are advised to arrive in Minneapolis on Sunday, October 8. The first general session will start at 9:30 a.m. on Monday, in the Leamington Hotel. All scheduled sessions will be held in this hotel.

There will be no central housing bureau for this meeting. Members should make their own room reservations direct with the hotels of their choice. In case the Leamington cannot accommodate all who request rooms, the overflow will be taken care of at the Curtis Hotel, directly across the street.

To enable the hotels to confirm requests, reservations should be received by them not later than September 15. Early reservations are advisable.

In all cases, reservation requests should state that they are for this particular meeting.

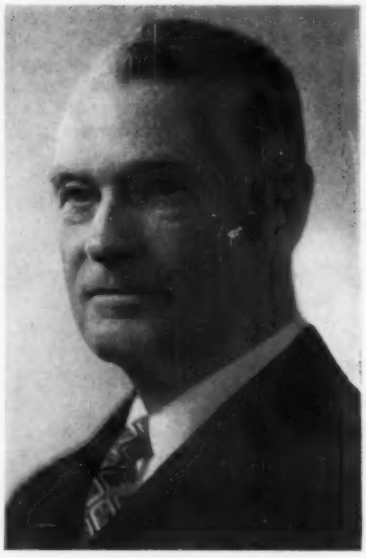
Additional cooperating hotels are listed below with their rates prevailing at the time this issue went to press.

The map of downtown Minneapolis, printed in this issue, will indicate the locations of cooperating hotels, and their distances from the Leamington. All listed below are within walking distance, or at most a short taxi ride, of the Leamington.

Persons wishing additional information about hotels and motels, and their rates, may obtain it from the Convention Department, Minneapolis Chamber of Commerce, 701 Second Avenue South, Minneapolis 2, Minn.

### Hotels and Rates

All rates quoted are for rooms with baths. If the rate category requested is not available, rooms in the next highest category will be assigned.



JOHN H. HINMAN, DINNER SPEAKER

Leamington Hotel (700 rooms), 10th Street at 3rd Avenue South, Minneapolis 4. Single occupancy, $8.50-$16.50. Double-bed rooms, $12.50-$18.50. Twin-bed rooms, $13.50-$21.

Curtis Hotel (800 rooms), 10th Street at 4th Avenue South, and Curtis Motor Lodge, 10th Street at 3rd Avenue South, Minneapolis 4. Single, $6.50-$10. Double, $8.50-$12. Twin, $11-$16.

Francis Drake Hotel (200 rooms), 10th Street and 5th Avenue South, Minneapolis 4. Single, $7-$11. Double, $9-$12.50. Twin, $11-$15.

Hampshire Arms Hotel (186 rooms), 900 - 4th Avenue South, Minneapolis. Single, $5-$6.50. Double, $7.50-$8.50. Twin, $8.50-$10.50.

Mark Twain Hotel (200 rooms), 1030 - 2nd Avenue South, Minneapolis 2. Single, $6.50-$8.50. Double, $8.50-$10.50. Twin, $9.50-$12.50.

Normandy Hotel (100 rooms), 8th Street at 4th Avenue South, Minneapolis 2. Single, $7-$10. Double, $11.50-$13. Twin, $15-$16.

Pick-Nicollet Hotel (600 rooms), Nicollet and Washington Streets, Minneapolis 1. Single, $9-$13.50. Double, $11.50-$16. Twin, $12.50-$17.50.

Radisson Hotel (500 rooms), 45 South 7th Street, Minneapolis. Single, $8.50-$13. Double, $12-$16.50. Twin, $15-$20.

Sheridan Hotel (430 rooms), Marquette at 11th Street, Minneapolis 3. Single, $6-$6.50. Double, $8-$9.50. Twin, $11-$12.

ALUMNI FUNCTIONS AT THE ANNUAL MEETING, SAF
October 9-11, 1961, Minneapolis, Minn.
(as of July 25, 1961)

| School | Alumni function | | | |
|---|---|---|---|---|
| | *Location* | *Date* | *Hour* | *Cost* |
| California, Univ. of | Leamington Hotel Pres. Jefferson Room | Monday October 9 | 6:00 p.m. | |
| Duke University | Pending | | | |
| Georgia, Univ. of | Leamington Hotel Pres. Roosevelt Room | Tuesday October 10 | 7:30 a.m. | 3.00 |
| Iowa State Univ. | Edgewater Inn | Monday October 9 | 7:00 p.m. | 4.00 |
| Maine, Univ. of | To be announced | Tuesday October 10 | 7:30 a.m. | |
| Massachusetts, Univ. of | May schedule later | | | |
| Michigan State Univ. | Curtis Hotel Evergreen Room | Tuesday October 10 | 12:30 p.m. | 2.75 |
| Minnesota, Univ. of | Radisson Hotel | Monday October 9 | 6:00 p.m. | 4.50 |
| Montana State Univ. | Leamington Hotel Pres. Jackson Room | Tuesday October 10 | 7:30 a.m. | |
| Oregon State Univ. | May schedule breakfast | | | |
| Pennsylvania State Univ. | Leamington Hotel | Monday October 9 | 9:00 a.m. | 1.00 |
| Purdue Univ. | Charlie's Cafe | Wednesday October 11 | Luncheon | 1.75 |
| State Univ. College of Forestry at Syracuse Univ. | Curtis Hotel | Monday October 9 | 6:30 p.m. | |
| Utah State Univ. | Curtis Hotel Evergreen Room | Monday October 9 | 7:30 p.m. | 3.25 |
| Washington State Univ. | Leamington Hotel Pres. Adams Room | Tuesday October 10 | 8:00 a.m. | 1.75 |
| Yale Univ. | Minneapolis Athletic Club | Tuesday October 10 | 5:30 p.m. | |

## Points of Interest

For foresters attending the CIF-SAF joint annual meeting at Minneapolis a guide map giving points of interest over a broad region of Canada and North Central United States appears in the back of this issue.

# Some Considerations for Optimizing Public Forest Recreational Development and Value[1]

**Ronald I. Beazley**

THE AVERAGE annual percentage increase in visits to the various park systems, refuges, and national forests, has been in the range of 10 to 20 percent per year on a sustained basis in the post-World War II period. Municipal parks have had a somewhat lower average rate of increase, about 4 percent, while some reservoir properties have experienced an average rate of almost 30 percent (*1*).

The major parks and forests approximate a 12-15 percent compound growth rate in number of visits, which is an extremely high rate of increase when compared to other indicators of growth, such as population, with a 1.75 percent rate and real national product at about 3 percent. Why should outdoor recreation be so much higher, and on an apparently sustained basis?

Some of the reasons typically suggested include population growth itself, changes in work environment, changes in hours of work and in vacations, changes in the distribution of income, increasing urbanization, and the general increase in the ease of travel. The consistent rate of family formation, recently about equal to the rate of population increase, also has a positive effect, since outdoor recreation is compatible with small groups and especially children. It is also likely that our increasingly liberal attitudes toward leisure, and the apparently increasing status value of an outdoor vacation are conducive to increased participation.

Both a continuing increase in disposable per capita income and a changing distribution of income in favor of skilled and semiskilled workers are permitting more and more people to participate if they wish. Longer weekends and paid vacations also have acted permissively, as do less puritanical attitudes toward leisure. Similarly, cheaper, more convenient highway, bus, and air travel in effect is bringing forest recreation areas closer to the population, thus permitting more participation. But the *desire* to participate and thus to make use of these permissive circumstances for outdoor recreation, instead of something else, appears to be caused by another factor. It seems to be a psychosocial urge *to participate generally*, and particularly in an outdoor environment. Americans have always had the urge to see what is over the next hill, but increasingly since World War II they have also wanted to become more of a part of what is over that hill; and in large degree this consists of the natural environment of forests and water. No doubt increasingly concentrated, and sometimes monotonous work environment, associated with increasing urbanization, heightens the need. However, it is not the purpose of this discussion to attempt to quantify or even identify the complex of variables at work which form this psychosocial factor sustaining the rate of change in taste toward the forest and outdoors. But it is reasonable to assume that tangible and intangible changes in environment, particularly those stemming from an increasingly complex society, associated with higher levels of education and perception, form the basis of what is presumably the cultural change taking place. Apparently there is more to life than fleeting glimpses of the spectacular from a tail-finned automobile, and a house in the suburbs stocked with a T.V. and home appliances — P.T.A. meetings, clubs, and cronyism notwithstanding.

Although the 12 to 15 percent rate of increase in participation is likely to taper off eventually, there is no good reason, in view of the causes, to expect it to decline in the near future, barring unexpected emergencies. For some time to come it would appear that both the permissive circumstances and the variables contributing to an increasing desire for forest and outdoor recreation will behave so that they will continue to support a substantial rate of increase. Even the prospect of short-term recessions would not be expected to have a depressing effect because less expensive forms of outdoor recreation can be substituted readily for more expensive ones, or they may be substituted for other more expensive leisure time pursuits generally.

The implications for foresters and land managers of such an expanded rate of increase in participation in outdoor recreation are, first, that larger numbers of people will want to participate more so in the future, and secondly, that there will be a greatly increasing use-pressure on desirable land, facilities, and services. Marion Clawson has estimated, perhaps conservatively, that there will be 10 to 40 times as many annual visits to the national forests alone, by the year 2000 (*2*). The use of land, facilities, and services for this order of magnitude of visits

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[1]From a paper presented at the meeting of the Central States Section of the Society of American Foresters, Chicago, Ill., October 1960.

on most of our outdoor recreational lands will cost billions of dollars per year.

These realistic estimates raise some important questions, not only because we are dealing in figures which would account for a substantial portion of our expected national income in future years, but because a great deal of our total energies and culture as a nation will be involved.

Some of the questions are these: What kinds of values, as individuals and social groups, are we receiving from recreation? How should they be paid for and by whom? What will tend to control the optimization of these recreational values accruing to all concerned?

To consider possible answers to such questions intelligently, it is necessary to examine these values, show how they arise, and to see who receives them, which is the main purpose of this discussion. However, before considering forest recreational values specifically, and how they arise, I shall discuss briefly the general notions of value, production, distribution, and consumption.

Consider how economic value arises, in the sense of some good or service, which will yield satisfaction to people. First, there must be a technology—a method and organization for producing and distributing the product. Secondly, there must be a method of paying for it, or financing it, since sacrifices are involved in its production. Thirdly, it must be capable of being used or consumed over time to the greatest degree possible, if we are to get the most from our sacrifices. Whether we get the most out of something for what we put in, and whether we put the right amount in, depends on our understanding of how it can be produced, distributed, paid for, and consumed. It is most important that we know what is being "consumed," in the sense of the kinds and amounts of benefit the consumption stands for.

In the case of many consumer goods—pencils, clothespins, shirts—individual enterprises produce and distribute them on the usual profit-motive basis, and these goods are paid for by consumers individually because they are consumed individually, with the individual receiving essentially all of the value.

On the other hand, the defense system which provides a basic service, is feasible to organize and operate, that is, "produce and distribute," only socially; in this case nationally, if it is to have any real value. Furthermore, it can be paid for only socially, that is, jointly, and not just because of its method of production, but also because its value can be utilized only jointly.

An example of an in-between case is the postal system. Conceivably it could be organized on an individual enterprise basis, but national organization and operation are much more efficient, particularly in terms of the certainty of the service. However, this service is paid for, very largely, by consumers as individuals, just as they pay for the services of private enterprise, because a great deal of the value is easily identified on an individual-use basis. We produce and distribute this service socially, and pay for it largely individually, though partly socially, because there is some joint or social value over time. We use this mixed system because we think it yields the greatest value or satisfaction for all concerned.

Our question is, into what sort of "production, distribution, payment, and consumption" system does public outdoor recreation fit?

To partially answer this question we shall first examine the values of forest and outdoor recreation.

## Values from Forest and Outdoor Recreation

Outdoor recreation is important because of its initial, direct effects on individuals. It is important also because of its subsequent, indirect effects on our society as a whole, in both short and longer-term senses.

The direct effects of recreation may be considered as:

1. Greater physical health.
2. Better mental hygiene, i.e., inspiration, hope, optimism.
3. Educational and cultural effects, i.e., greater understanding of one's environment and a better ability to enjoy it.
4. The immediate satisfaction of consumption, i.e., the immediate fun of participation.

Each of these commonly agreed-upon effects may be considered as future streams of benefit or satisfaction potentially available over time from the use of the resource. As such, each can be thought of as the present worth of the stream of benefits discounted back from the future to the present, just as we would consider the present worth of a future stream of dollar income. Thus each represents a present *utility value* of expected future benefit, just as the discounted present value of future net dollar income represents present capital value. As we shall see, these direct, individual values represent only a part of the total value which accrues, because the social value has not yet been accounted for.

Now when one talks of value, there are a dozen concepts of it which may be used. But apart from the notion of the present utility value of expected future consumption, just mentioned, we need to be concerned with only two other concepts of it. These are individual versus social values, and market or common money values.

First, it will be convenient to consider the individual and social values involved.

Besides the fun of participation in recreation, the individual receives directly the benefits of better health, better mental outlook, a deeper education, and is better able to interpret and enjoy his total environment. Notice that he may not be conscious of the health, mental hygiene, educational, and cultural values, or if so, often to a relatively small degree. It is the utility of immediate participation, simple fun, which tends to involve him with the other values, just as does the floating toy in a little boy's bath—he tends to enjoy himself and come out as a much more acceptable little boy, to both himself and others!

When an individual decides to

engage in outdoor recreation, it is difficult to measure how much of each of the four personal benefits or values mentioned above is affecting his decision to participate —probably the satisfaction to him of immediate participation or fun, is predominant, though. He may also derive a good deal of reflective or vicarious enjoyment in the future, yielding him still more satisfaction, which may bolster his decision to participate again.

On the other hand, society, in the sense of the national community, or many of the smaller groups, also tends to benefit. It benefits as a whole over time, in at least two ways.

First, we as a society, are better off in terms of our general frame of values because of the *diffusion* of individuals' direct benefits of improved mental attitudes, better physical health and deeper education. We are happier, more pleasant, more stimulating and more resilient over time, and we suffer fewer cases of poor mental and social health, including crime. That is, society's immediate income of satisfaction is increased, in addition to the direct benefits received by individuals.

Even if that were the end of the social value, we would be better off for it. But a second social value accrues by means of an increase in income and output from the economy generally; the only requirement for this conclusion being that there is a range of social complementarity between leisure time and gross national product, the latter being the result of what we commonly term "work." An increase in income results from people as a whole being better stimulated and more satisfied, who work better, produce more, innovate more and who are more creative over time, even though many of them may not have engaged in outdoor recreation. The question then becomes, *how much* work and *how much* leisure are needed to arrive at the most desirable combination.

But, may it not be argued that these benefits are in fact the same ones which accrued to the individual, even though he may not be particularly conscious of their cause? And isn't the social value simply the sum of individuals' returns of value? Of course, benefits in these same senses do accrue to individuals, but the social value is not the sum of individuals' immediate receipts, as it were. The social value, which it can be argued, is large and important, comes about because the effects of outdoor recreation on individuals, conscious or not, persist, and through time constructively affect a thousand and one interactions of the relations among individuals and groups in the process of normal social intercourse. Consequently, the total value is far greater than the sum of the immediate parts which accrue directly to individuals, the difference being the social value. Apparently then, it is necessary to first recognize these kinds of values to decide how the corresponding benefits should be paid for, whether by the individual or social groups, if individual and social benefits are to be equitably optimized. They must be measured, appraised or judged as well as possible to decide simultaneously, how much outdoor recreation there should be (which depends on leisure time and taste for such recreation) and who should pay how much.

## Measurement of Outdoor Recreational Values

Presently we cannot measure consistently *any* values or benefits in an ultimate, comparable sense. Any attempts at measurement are, of course, relative, and in many respects imperfectly relative. This does not mean that partial, imperfect measures should not be made: quite the contrary, since decisions must be made now and in the future. Even imperfect measurement and incomplete value frames of reference can be extremely helpful in making better decisions.

What of market values? It is usually possible to measure reasonably well what the market value of outdoor recreation would be in a given situation. This *market value of participation* found from market price may be measured by *demand analysis* in terms of dollars.

Consider the typical classroom market demand curve, which represents a ranking of less and less willing buyers, *DD*, (Fig. 1). At any given level of price, *PP*, there are some *least willing buyers* who will just purchase some of the commodity. This quantity, in addition to the amount purchased by all the more willing buyers, who would have bought at higher prices, just equals the quantity *Q*, which is sold at the demand price *PP*. Notice that the dollar value, the product of *P* times *Q*, values *all* of the output in terms of its dollar value to the least willing buyers. Consequently, it does not measure all of the dollar value accruing to the more willing buyers. Furthermore, since individual consumers do not, and should not, consider social values when acting simply as consumers, these values are ignored in the market demand value. Those individual benefits of which buyers may not be fully aware also tend to be ignored in market value measurements.

It is apparent then, that *market or demand* value of anything does not measure even its relative value in terms of dollars for many individuals or to society, let alone its value in some terms of ultimate satisfaction or utility. Market value measurements probably ignore all of the social value, and a good deal of the individual benefits of mental hygiene, education, and culture, as well as some of the health benefits from forest recreation.

Actually, the function of market demand values is to guide the allocation of more or less resources

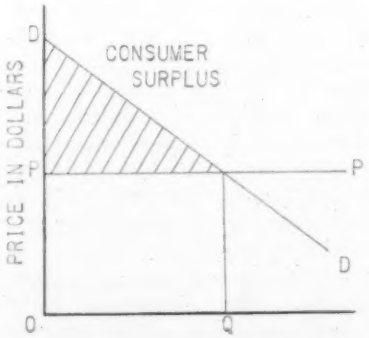


FIG. 1.—Quantity per unit of time.

into the production of a given product. In this function the least willing buyers are the buyers who count, because they largely are the ones who would buy more if more of it were produced and offered at lower prices. Market demand values tend to be good indicators for resource allocation *where the great majority of the benefit received is individual in character and is fully recognized by the consumer, with respect to both immediate and future effects,* as in the case of ordinary commodities. Obviously these criteria are not met in the case of outdoor recreation.

Because market price ignores to a great extent many important values involved in outdoor recreation, only some *small part* of the additional individual and social value of more outdoor recreation is indicated by the price least willing buyers would pay. Consequently, dollar or market demand value cannot be used as *the* major criterion governing the allocation of resources into outdoor recreation. However, despite the fact that it is less than an ideal measurement, estimated market price is still a useful one. As we shall see, it can be helpful in making decisions as between individual and public burdens of payment for outdoor recreation, as an indicator of fairness or equity, and as an aid in optimizing resource use.

Great art, education, hospitals, roads, and many other so-called "community services" fall more or less into the same category as outdoor recreation, wherein many social values, and unrecognized values to the individual are involved, often having long-term implications for the future of society. Actually, practically all products and services are similarly involved with the same market demand value problems to some degree; it just happens that outdoor recreation does not lie near either end of a social-individual value spectrum, but somewhere in between.

Where, in the instance of outdoor recreation, a good deal of value is not recognized by the market system, it is desirable to make other partial analyses of value through psychosocial approaches to preference, opinion and attitudes (*4*). Even unconscious notions of value and motive may be appraised to an extent, and such work in the outdoor recreational field could be extremely helpful, especially since relatively little has been done. But let me hasten to add that *any* analyses presently cannot hope to provide a complete, internally logical or even entirely rational system of value appraisal. Even with our best efforts at various kinds of value measurement using disciplined approach, the over-all problems of value appraisal in outdoor recreation will leave a considerable amount of uncertainty. Consequently, the attendant issues of resource allocation, financing, and use, which depend on these appraisals and forecasts, will continue to require large amounts of informed common sense and sensitive value judgment on the part of those making the necessary decisions.

***Benefit-cost analysis,*** wherein the ratios of indentifiable dollar benefits and costs are compared among alternative government projects, is an aid used in making these value judgments. But it is only an aid since many values, particularly indirect values occurring over time, social and otherwise, cannot be measured properly.

There are also a few other, sometimes misleading, attempts to measure and compare outdoor recreational values, of which we should be aware (*3*).

One of these, ***consumers' surplus,*** represents the amount of money value indicated by the area above the price line, and below the demand curve in Figure 1. It is the amount of money each buyer would have been willing to pay had he been required to do so, in order to purchase the amount he did buy. In other words, consumers' surplus here represents the monetary "bargain" one gets when the price one would have paid is above the market or least-willing buyer price. The main use of its possible estimation is to attempt to show the net benefit to the public in dollar terms, above total cost, of a given forest recreation area (*5*). In this sense it may be useful as a partial measure of the net public benefit of the area, but it still would not indicate the unrecognized benefit to individuals nor the social benefit. And we could not compare this use to alternative uses of the area unless *their* consumer surpluses were also measured. Furthermore, there are some inherent conceptual difficulties in measuring it, although these may not be insurmountable.

Second is measurement of *gross dollar volume of business or income* connected with outdoor recreation. In this case the dollar values to least-willing buyers of many products purchased in association with outdoor recreation are added together. Of course, essentially all of this money would be spent in some other way by the people concerned, in the absence of the recreation area under consideration; a good deal of it for the simple requirements of day-to-day living. Thus gross expenditure does not measure the marginal demand value as dictated by prices least-willing buyers would pay for the use of the resource itself. In itself it does not give any clue to the dollar value of the recreational output in question. In other words, we are dealing with the wrong thing if we are looking for a measure of either the total dollar importance of outdoor recreation, or a criterion as to the justification of further expenditures on outdoor recreation.

One other often-used method is *value added* by recreation-related expenditures, which amounts to gross recreation-related expenditure less the cost of materials. It *does* show volume of net new market business or income value in the community, which may be compared with alternative uses of the land. But, again, value added does not indicate a market demand value of the resource itself. And, as in the case of gross expenditures, it may well show up in about the same magnitude elsewhere, in the absence of the local land-use in question. In all of these cases, i.e., of consumers' surplus, gross expenditures, and

value added, social values are, of course, ignored.

### Avenues for Financing Public Recreation

Having considered something of the size of the recreation issue, the kinds of values involved and their importance and measurement difficulties, let us briefly consider the logical avenues for financing it, where by "financing" I mean nothing more than rational methods of payment.

Obviously some of the cost, particularly for certain kinds of outdoor recreation, where the participation values to the individual are obvious, should be paid directly by individuals. The exchange could be efficient, and equitable or fair, to those involved. But what of those benefits which have a definite individual component, wherein the individual is largely unaware of the individual benefits he does receive, e.g., better individual mental and physical health? One's first reaction would be to say, "Raise the price of participation," but this is an irrational and thus unacceptable suggestion because it is tantamount to saying "Charge him more than he will pay!"

One long-term solution would be to educate people concerning these values of which they are presently unaware, so that they would be willing to pay for them, i.e., in effect to shift their demand curves for participation *up* (Fig. 1) such that they would pay more for the *same amount of* participation. This is what people attempt to do by various means and for various motives in commercial advertising—now we can see the fine difference between education and advertising! Another more immediate approach would be to tax more widely and more heavily those items used in participation, such as skis, camping equipment, binoculars, etc., on which people *would* pay a higher price to cover the tax, and then transfer the revenue to the agencies providing recreation resources. In other words, broaden the present Federal Aid in Fish and Wildlife Restoration programs which are financed from excise taxes on certain fishing equipment, firearms, and ammunition. Such a plan would be practicable, and equitable as well, since only those who *did* participate would bear the tax burden.

Apart from either direct or indirect payment by *individuals* who participate in outdoor recreation, the other method of payment is from the general revenues of the various local and state governments, as well as the federal government. Payment through such agencies for some major part of many kinds of outdoor recreation is justified, since, as we have argued, a great deal of the value involved is social in nature. Quite apart from the usual argument of the impracticability of both the production of outdoor recreation and the collection of payments by private owners, payment of a major part of the cost by government is necessary to more nearly optimize the social value of outdoor recreation.

Regarding private owners of large land areas having considerable social recreational value, it would appear justifiable that they receive payments from government, to the extent that they make their lands generally available for public recreation. There would seem to be little reason for the subsidization of social values by the private sector of the economy, although this happens to some degree in the absence of transfer payments from government. Private payment by corporations and companies for social benefits simply tends to increase the prices of the products of these firms, thus putting some of the burden of paying for social values inequitably on the shoulders of those buying the particular products in question. It may also unjustifiably restrict the sale of these products to a degree in view of their increased prices. Since the money which companies use for this purpose must come from somewhere, the other outcome, in the absence of product price increases is, of course, a tendency to force down the prices of the goods and services used in production by the firms involved. This has similarly undesirable consequences. Furthermore, in the absence of transfer payments from governments to the companies concerned, it is to be expected that companies would under-allocate resources for the development of social values from their lands, unless, of course, a great deal of public relations value to these firms was involved. This again, is an inequitable method in view of the purpose involved. Various methods of effecting transfers are possible; perhaps the simplest would be special rebates or tax concessions in view of socially desirable outdoor recreation expenditures by the firms concerned.

### Resource Allocation

I have no intention of attempting to get into that fascinating field concerned with the actual physical combination of forest recreational resources on individual areas, nor to be concerned even with the general issues of design, master-planning, organization and management, for obvious reasons.

Rather, I shall consider a few of the major aggregate allocation and use problems involved.

One of the most striking is the extreme *maldistribution* of our forest and outdoor recreational resources relative to the present (and likely future) population distribution and density. We now have about 50 percent of our population in the Northeast, where there exists presently only 14 percent of our recreational land, whereas about 4 percent of the population is in the western mountain region, which encompasses about 28 percent of the recreational land (*2*). Effectively, if not literally, we need to "create" outdoor recreational space relative to the heavily populated areas.

One way to do this is to make serious attempts to deliberately plan our total highway, railroad, airline, and water transportation systems with ease of reaching outdoor recreational resources as one of the main objectives—not simply to try to maximize the ease of inter-city travel, or the simplicity with which one can go from coast to coast. If such a thought sounds

grandiose, recall the greater and greater numbers of billions of dollars of annual expenditure expected to be involved in the direct costs of outdoor recreation.

Another way of "creating" recreational resources is through direct invention and innovation. We have for many years approached the design and handling of our recreational resources in simple, sometimes obvious time-tested ways. How can resources of this kind, particularly near populated areas, be physically combined in novel ways so as to, say, double the capacity to provide satisfaction which they presently have? To do so will require some careful study of how, on the actual site, satisfactions are in fact generated and how resources can be better planned physically to create these satisfactions. Obviously such an approach will require that more money and capital go into research and into the areas themselves in terms of landscape, design, facilities, and control. Such use of capital to create simple capacity, and effectively increase the quantity of the recreational resource would well pay for itself, at least up to a point.

Another problem in recreational resource allocation is long-run *flexibility*, both spatially and over time. For example, the composition of our population has changed. Presently we have both more young people and more older people than we used to have. Each of these groups wants different *kinds* of forest and outdoor recreation *now*, and within reason, *in the vicinity* of where they live. Usually these changes are not sudden; most can be predicted considerably in advance and planned for. Flexibility in use over time and space is needed in order to be able to change the qualities of the resource and insure its most beneficial use.

Analogous to the maldistribution problem, is what may be termed the *institutional allocation problem*. Numerous public and private institutions or agencies literally do the allocating of this resource, yet many have diverse capabilities, prerogatives and formal obligations, which no longer hold much relation to the obligations in resource-use planning and allocation which they should be able to accept. A good deal of inter- and intra-agency redesign and reorganization for the efficient allocation and management of recreational resources is implied, if we are to meet the emerging national outdoor recreation problem, particularly in view of the somewhat abstruse, yet important nature of the values which such allocation largely determines.

Finally, I would like to mention one other point which is also concerned with resource creation and allocation: that is what may be termed *the time dimension of the allocation*. By this, I mean simply the amount of time per year during which the resource can be exposed to people, that is, the amount of time they can be in contact with it. Quite obviously one cannot have rationally allocated a resource unless the customer can use it! Consequently, the more use he gets from it the better it has been allocated. If a given recreation area is used twice as long per year, effectively it is about the same thing as having allocated twice as much resource.

One way to increase the allocation in this sense is to keep the facilities open longer: more hours per day (perhaps with an assist from artificial light), more days per week, and more weeks per year. But a more productive method of resource creation would be to change some of our currently accepted customs in the use of time which may act to severely diminish the amount of satisfaction people can derive from the recreation resource. We could adopt customs in the use of time which would give people the opportunity to visit these recreation sites when the areas are *not* overcrowded. By simply substituting Mondays for Saturdays as the "day off" on a weekend, for about half of us, to go along with Sunday, the resource could be effectively enlarged by up to one-third. The same argument would also hold for a huge number of other resources, such as roads and transportation facilities generally.

If the two day "weekend" were staggered throughout the week, the use possibilities could be multiplied by hundreds of percent. Such a scheme is certainly attractive from the point of view of increasing the enjoyable use of recreation resources themselves, as well as the associated resources. On the other hand, it would tend to disrupt the time sequence of religious custom by having "one day in seven" occur every day. While this may put an additional burden on the clergy (but perhaps not an undesirable one), it would lighten the burden of cost for places of worship. The fully staggered weekend would also cause employers some initial problems in labor and production scheduling. But it is quite conceivable, once the transition were accomplished, that aggregate efficiency of production in the use of both capital and labor would be increased, particularly when one considers the salutary effect of a relaxed, uncrowded weekend!

A more immediately acceptable way would be the scheduling of vacations jointly by employers and employees, from the point of view of optimum use of recreational resources. Such additional use of the resource could be achieved to some considerable degree, particularly if regional and national outdoor recreational facilities, as well as climate, were considered in scheduling vacations. Education of employees by joint employee-employer groups as to the value of such a system, in addition to a current annual scheduling program to show which periods are overcrowded, would tend to make the system feasible. Planned regional coordination among major employers also would be highly desirable.

Regional and national vacation-impact planning has another obvious implication, apart from greatly improved recreation resource use. That is the possibility that production may be somewhat reduced in some parts of the economy because of such scheduling. The question is, how much scheduling can be done before the loss from the non-recreation parts of the economy becomes greater than the gain in

recreation resource use?

In short, effective recreational resource use could be at least doubled simply by arranging for some people to be there when others are not, and perhaps by extending the current hours of use.

## Opportunities for Increasing Development

It becomes apparent that optimum acceptable recreational resource development depends in large part upon the kinds of values involved, their identification and the estimation of their implied demands, and the development and articulation of the avenues for paying for these values. It depends as well upon the degree of imagination, planning and coordination which recreation resource allocators and managers are capable of exhibiting in the actual allocation-management process over time. And more so in the future, it will depend on our social flexibility in the conventional use of time. Optimum development, then, means maximum satisfaction in use of present and potential outdoor recreational resources, subject, of course, to higher demands on our time and money for still greater satisfaction and more important additional values per dollar of cost, which may be available from other parts of the economy.

The optimum development problem is complex. It has many simultaneous relationships; it is dynamic and hence requires continuous appraisal. There are many subtle, extra-market values involved which are nonetheless important and require our most careful attention and evaluation.

First we must identify important, sometimes elusive individual and social values. Then the problem is to infer how much of each kind of value would be forthcoming, so they may be paid for in equitable proportions by individuals and by the various levels of government. It is important to recognize that if we continue to expect individually recognized values, which individuals would in fact pay for, to be paid for socially through government simply because government must manage the resource, we will not optimize development and the values involved. Market demand measurement is obviously implied. If, conversely, we were to charge such high prices to individuals that many people would be deterred from participation, we may seriously impair important social values. Clearly, extra-market value measurements and judgments are implied.

Notice that the question here does not primarily concern income distribution, nor does it have much to do with public versus business expenditure. Rather it is one of arriving at the optimum proportion of the total cost which should be paid for directly by participants and by governments. These proportions may differ with differing situations, but only when the "correct" proportions are adopted in each given circumstance can we expect total satisfaction and thus resource development to be optimized.

More efficient, well articulated, and flexible methods of paying the government share of the cost are, of course, inherent in the optimizing of forest and outdoor recreational resource development. Without adequate methods of financing, this bottleneck could largely nullify other efforts. Partly it is a matter of public education. But largely it rests on recognition of the problem of value identification and consequent financial organization of governments so that they may, having perceived the values involved, appraise them and act cooperatively in their financing; if necessary, through regional recreational authorities and compacts, in addition to our present levels of government.

All of this is going to take a good deal of continuing research in the social sciences as well as in the various physical arts and sciences related to the out-of-doors. But even more so, it will require planning and coordination among all of the agencies and firms involved to make use of such research, some of which is presently available. Then it will take more planning and more organization — more intelligent anticipation of the future and more preparation for it. Provision for continuing research, coordination and planning appears to be a necessity, no matter how well *ad hoc* commissions and boards may do their jobs. Granted, we could reach a degree of planning intensity where a higher level of it would no longer pay, but in view of the complexities to be faced, we are a long way from that point now.

No longer is the goal just to do things big—to take sporadic giant steps and then ignore the problem until it again represents a crisis. If we are to envision the United States as becoming a large, beautifully conceived, flexibly designed outdoor environment capable of responding to changing tastes and demands for all the uses of land, continuing forethought and planning are required.

## Literature Cited

1. CLAWSON, MARION. 1958. Statistics on outdoor recreation. Resources for the Future, Inc. 165 pp.
2. ————. 1959. The crisis in outdoor recreation. American Forests. March and April.
3. ————. 1959. Methods of measuring the demand for and value of outdoor recreation. Resources for the Future, Inc. 36 pp.
4 DANA, S. T. 1957. Research in forest recreation. Forest Service, U. S. Department of Agriculture, Washington, D. C. 36 pp.
5. HOTELLING, H. In PREWITT, R. A. ET AL. 1949. The economics of public recreation. Land and Recreational Planning Division, National Park Service, Washington, D. C.

# What Does Insecticide Treatment for White Grub Control at Time of Field Transplanting of Pine Trees Mean?[1]

**R. D. Shenefelt, R. C. Dosen and D. W. Renlund**

WHITE GRUBS, the larvae of what are commonly called "June beetles" or "May beetles" (*Phyllophaga* spp., Scarabaeidae, Coleoptera), have caused much damage in conifer plantations being established in the Lake States area. They quickly attack many of the trees in field plantings, killing some by completely stripping or cutting off the roots, and slowing the growth of others and making them more susceptible to drought conditions by lesser injuries of the same type.

In 1954 a spraying device, designed for attachment to a tree planter to apply insecticide to the roots of transplants as they are set in the ground, was described briefly in the Forestry Research Notes of the University of Wisconsin.[2] The apparatus was further characterized and illustrated in Tree Planter's Notes in 1955.[3] The results obtained in the plot at the end of the first year were published in 1956.[4] Six seasons have now elapsed since this plot was established and it appears worthwhile to describe and attempt to interpret what has occurred within it.

Half of the red pines (2-2) set in a grassy field in Adams County, Wisconsin, in the spring of 1954 were treated with aldrin emulsion[5] at 1.0 percent or at 0.5 percent. As the trees were planted each received approximately 8.5 ml. of emulsion on the root system. Some of the insecticide fell on soil in the furrow. Treated rows were alternated with untreated and the area containing alternating rows of trees treated with 0.5 percent emulsion was contiguous with that in which the 1.0 percent was used. The test was designed primarily to determine the practicality of operation of the sprayer and whether or not phytoxicity would result from the presence of insecticide on the tree roots. During the planting no grubs were observed. However, grubs were abundant and soon came toward the surface to begin feeding upon the newly set trees.

By September 22, 1954, the results were as are shown in Table 1. Measurements of the growth occurring in 1954 in the four types of trees were also taken at this time.

In early November 1955 the section containing alternate rows of trees treated with 1 percent aldrin and untreated was re-examined. The untreated trees, which showed 9.3 percent mortality in 1954, then showed 39.5 percent dead. In contrast only 3.1 percent of the treated trees had succumbed. The treated trees still showed better color than the untreated and differences in growth were becoming quite evident.

After six seasons of growth (in early May of 1960 before the buds had broken), the plots were again studied. The data are presented in Figure 1. For each row the average height, the height of the tallest tree measured, and the survival percentage are shown. The average height at planting and the growth occurring during the season immediately following planting (1954) are also shown for the portion of the field where one percent aldrin was used.

During 1954 the difference in survival between trees treated with 1 percent emulsion and untreated trees amounted to 8.0 percent. In the following year this increased to 36.45 percent. From 1956 to 1960 there was only a slight additional difference, the final figure being 37.33 percent.

From the data it is evident that by far the greatest percentage of deaths occurred during the season following the year of planting. In the control rows there are still some trees that are very small and mortality is continuing. Since the deaths are not due to suppression from above (but by now root competition may be occurring) the full effects of grub control cannot even yet be evaluated.

The contrast between heights of

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[1]Results of a cooperative project between the Agricultural Experiment Station of the College of Agriculture, University of Wisconsin, the Wisconsin Conservation Department, and the Nekoosa-Edwards Paper Company, Port Edwards, Wis., supported by the Wisconsin Conservation Department and the Wisconsin Agricultural Experiment Station. Insecticide furnished through the courtesy of Shell Oil Company. Approved for publication by the Director of the Wisconsin Agricultural Experiment Station.

[2]Shenefelt, R. D., H. R. Liebig, and R. C. Dosen. Protecting machine transplanted trees from white grubs. University of Wisconsin Forestry Research Notes No. 17, 3 pp. October 1954.

[3]Shenefelt, R. D., H. R. Liebig, and R. C. Dosen. Protecting machine transplanted trees from white grubs. Tree Planter's Notes No. 20, pp. 14-17. June 1955.

[4]Shenefelt, R. D. A further note on protecting machine transplanted trees from white grubs. University of Wisconsin Forestry Research Notes No. 25. 3 pp. January 1956.

[5]Aldrin is the common name for a product containing "not less than 95% of 1, 2, 3, 4, 10, 10-hexachloro-1, 4, 4a, 5, 8, 8a-hexahydro-1, 4-endoexo-5, 8-dimethano naphthalene." The emulsion used was made by diluting a commercial 40 percent emulsion concentrate to the degree necessary.

TABLE 1.—PERCENTAGES OF TREE SURVIVAL AND COLOR

| | 1% aldrin (871 trees) | Untreated (827 trees) | 0.5% aldrin (1032 trees) | Untreated (1017 trees) |
|---|---|---|---|---|
| Normal | 97.7 | 26.7 | 83.7 | 37.9 |
| Off-color | 1.0 | 63.8 | 13.7 | 42.5 |
| Dead | 1.3 | 9.3 | 2.7 | 19.6 |

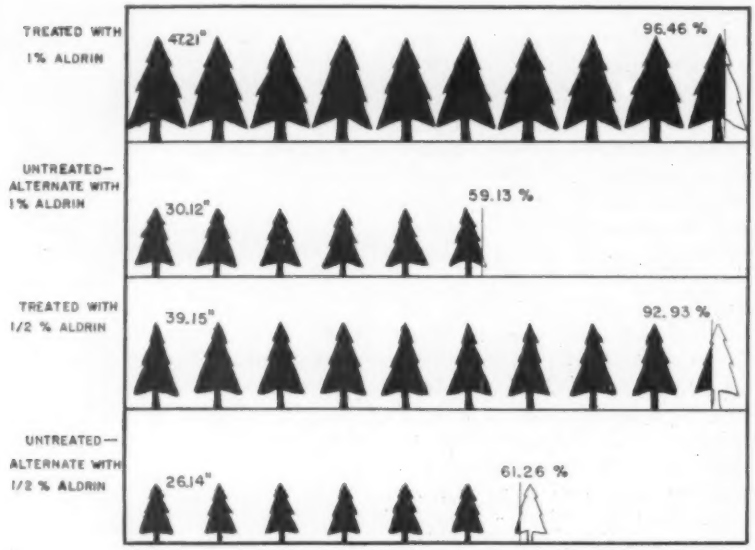


FIG. 1.—Growth profile—odd-numbered rows treated, even untreated.

treated and untreated rows is striking when the profile is considered. The untreated trees average only 63.6 percent the height of the treated. Or, putting it another way, grubs have apparently been responsible for a growth loss of 36.4 percent due to their feeding upon tree roots. However, this will be discussed later.

Figures 3 to 7 are views of the plot receiving one percent aldrin on every other row. One untreated row is marked in each photograph by an arrow to assist in orientation.

In the area receiving 0.5 percent emulsion the trends are similar. During the first season 16.9 percent more trees died in the untreated than in the treated rows. By the spring of 1960 this had increased to 31.67 percent. The untreated trees show a growth loss of 33.2 percent when compared to those receiving the insecticide.

A difference of 1.4 percent in mortality occurred during the first season between trees receiving 1 percent aldrin emulsion and those whose roots were sprayed with the 0.5 percent strength. During 1955 this difference increased to 3.53 percent and after six years it remained the same. The average

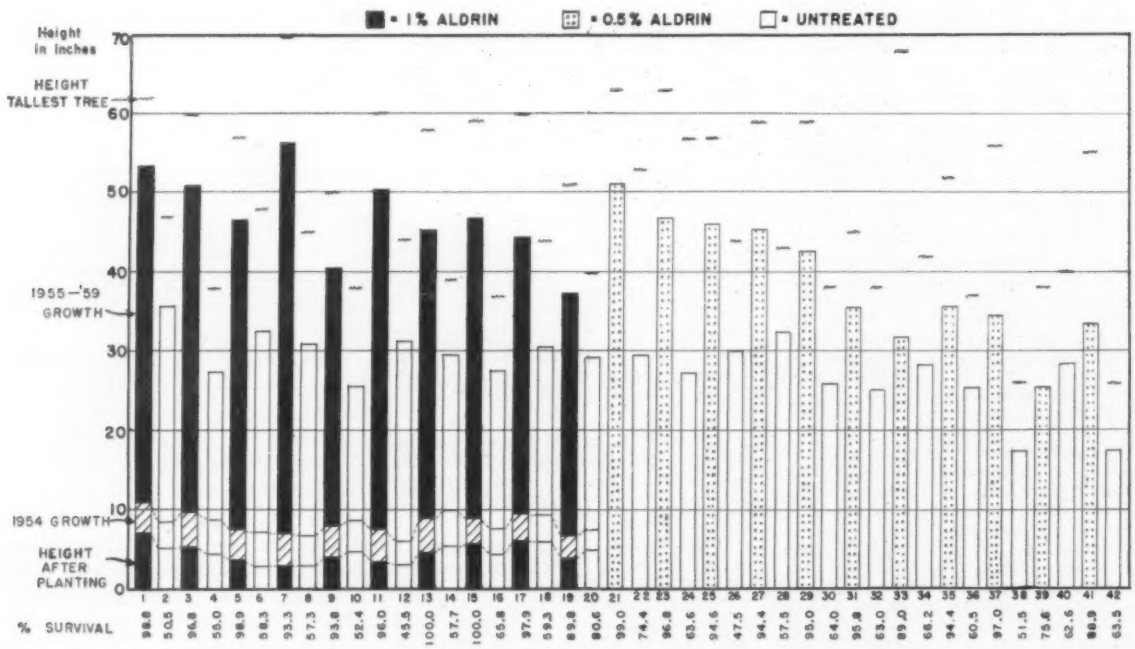


FIG. 2.—Survival and size of trees after six seasons. (Each symbol = 10%.)

FIG. 3.—September 1954. Every other row treated with 1 percent aldrin at planting in spring. Arrow marks untreated row.

FIG. 4.—September 1956. Same area as in Figure 3.

height of the trees treated with 0.5 percent aldrin was only 83 percent of that occurring in the trees receiving the higher dosage.

If we compare the untreated rows in the two areas differences are also found. During the first growth season 10.3 percent more trees died in the control rows lying between rows treated with the one-half percent strength than in those located between rows receiving one percent. However, by the spring of 1960, 2.13 percent more mortality had occurred in the controls for the one percent than in those for the one-half percent treatment (40.87 versus 38.74). A difference of 3.88 inches occurs in the average heights of the two (30.02 inches in the controls for one percent aldrin, 26.14 inches in those for the one-half percent). The trees located between rows treated with one-half percent aldrin were approximately 13 percent shorter than those lying between the rows receiving the higher concentration.

Using the height growth of the trees treated with one percent aldrin emulsion as a standard, i.e., as 100, the following percentages occur: 1 percent aldrin-treated—100; ½ percent aldrin-treated—83; untreated placed between rows sprayed with one percent—67; and untreated between rows receiving one-half percent—55.

The situation at the commencement of the 1960 season as regards survival and tree size is shown in Figure 2 where the percentages of survival are represented by the numbers of tree symbols and the relative average heights are drawn to scale.

It is clear that the trees receiving the ½ percent aldrin treatment are smaller than those receiving the 1 percent treatment—but the "controls" lying between the rows receiving ½ percent aldrin are also smaller than the "controls" lying between those treated with 1 percent aldrin. Furthermore, as is shown in Figure 8, there is a very great difference between the trees in the area receiving the ½ percent on every other row and those on immediately adjacent land which was planted at the same time. Unfortunately, the question of what constitutes a control was not anticipated at the time the plots were set out. Neither was the grub damage anticipated.

Before discussing the results obtained, it might be instructive to consider certain analyses of variance. In these analyses rows 41 and 42 were not considered. This was done to make the number of rows equal for each treatment and also to eliminate possible border effect from the relatively open area next to these rows (Fig. 8).

FIG. 5.—March 1957. 1 percent aldrin applied to every other row in 1954. Arrow points to untreated row.

FIG. 6.—May 3, 1960. 1 percent aldrin. Arrow lies in untreated row.

For the average heights of the rows in all treatments the analysis showed the following:

| Source of variation | Sum of squares | df | Mean square |
|---|---|---|---|
| Between groups | 1818 | 3 | 606 |
| Within groups | 1930 | 36 | 38.8 |

F=15.7** F at 1 percent=4.38. Thus the null hypothesis must be rejected.

The results of the analysis of variance of average heights of untreated trees lying between the 1.0 percent aldrin-treated trees and those located between rows receiving 0.5 percent are:

| Source of variation | Sum of squares | df | Mean square |
|---|---|---|---|
| Between groups | 48 | 1 | 48 |
| Within groups | 169 | 18 | 9.39 |

F=5.1* F at 1 percent=8.28, at 5 percent=4.41. Therefore there is less than one chance in 20 that the null hypothesis may be true.

The analysis of the figures for the heights of rows treated with one percent aldrin and those sprayed with the lower concentration is:

| Source of variation | Sum of squares | df | Mean square |
|---|---|---|---|
| Between groups | 282 | 1 | 282 |
| Within groups | 221 | 18 | 12.3 |

F=29.9** F at 1 percent=8.28.

If we analyze the variance in the heights of the tallest trees measured in each row, we obtain the following:

| Source of variation | Sum of squares | df | Mean square |
|---|---|---|---|
| Between groups | 2340 | 3 | 780 |
| Within groups | 1913 | 36 | 53.1 |

F=14.8** F at 1 percent=4.38.

Comparable analysis of the tallest trees receiving aldrin at either dosage shows:

| Source of variation | Sum of squares | df | Mean square |
|---|---|---|---|
| Between groups | 37 | 1 | 37 |
| Within groups | 1004 | 18 | 55.8 |

F=0.66 n.s. F at 5 percent=4.41. Therefore the null hypothesis fits and there is no significant difference between these two sets of tallest trees.

Likewise the analysis of variance between the two sets of tallest trees occurring in the controls located between rows receiving one percent aldrin and those in untreated rows between trees sprayed with 0.5 percent shows that there is no significant difference.

| Source of variation | Sum of squares | df | Mean square |
|---|---|---|---|
| Between groups | 1 | 1 | 1 |
| Within groups | 909 | 18 | 50.5 |

F=0.02 n.s. F at 5 percent=4.41.

The analyses of variance of the heights of the tallest trees thus confirm sight judgment to the effect that the differences observed were not due to changes in site quality.

## How Can the Differences Be Accounted For?

1. The differences in average height after planting are thought to have no significance. The stock was of rather uniform size and the differences appear to have been due largely to the depth at which the trees were planted. Several men rode the planter in order to determine whether or not the spray attachment was practical and some of the height differences after planting seem to be associated with variations in the way in which the men set the trees.

2. Differences may perhaps be accounted for by variations occurring in the white grub populations from place to place within the area. It is well known that the adult beetles, for mostly unknown reasons, tend to select certain regions in which to oviposit and that the places chosen vary from year to year. The mortality rates occurring in the controls show peaks at rows 2, 12, 26 and 38. However, the total mortalities in the two plots were about equal, indicating that the populations may be considered as being comparable. Why then the differences in rates of growth in the two sets of control rows?

3. Even assuming that the grub population has been equally distributed over the entire area for the past six years (which is not likely) a number of things must be considered:

(a) The one-half percent dosage may have caused less mortality to the grubs than the one percent;

(b) The aldrin concentration may have been lowered by "weathering" in the soil and thus the one percent remained effective over a longer period of years;

(c) Aldrin may act as a root stimulant;

(d) Aldrin may be a repellent for both grubs and adult beetles; and

(e) There may be a combination of factors a, b, c and d, or any portion of these.

Assuming an equal grub population, that the grubs are equally attracted to the trees in both types

FIG. 7.—May 3, 1960. 1 percent aldrin. Man is standing in untreated row. Compare height of this row (below man's elbow) with that of treated rows on either side (nearly head height).

FIG. 8.—May 3, 1960. Area to right of mark received no treatment, that to left had ½ percent aldrin applied to the roots of every other row at planting in 1954.

of rows (treated and untreated), and that the one percent dosage was more effective than the one-half percent, we should have the following things occurring:

1. A greater percentage of grubs going to the one percent row would be killed than those going to the one-half percent row. Since grubs wander about quite freely underground within a localized area, this should result in less feeding on both treated and untreated trees in the area where the trees received one percent. (In this connection it must be remembered that only a small spot was sprayed around the tree roots and that the roots would rather quickly grow out of the treated zone.) A reduction in feeding should be reflected in increased height—which we find occurred. But why the higher mortality in untreated rows lying between those receiving one percent aldrin?

2. It is well known that soil insecticides lose their effectiveness in the course of time due to dispersion, leaching, and disintegration. It is also known that aldrin is converted into dieldrin fairly rapidly in soil and that dieldrin is a very persistent insecticide. However, it does not appear to kill older grubs as rapidly as aldrin.

Assuming a reduction in effectiveness, the kill in the one-half percent area should have declined more rapidly than that in the one percent area, resulting in more grub feeding on the trees and less rapid growth. This idea fits in well with the facts if we assume that the tree mortality occurred early—which also agrees with what happened, since most of the trees which died did so before the end of the second growth season.

3. If aldrin acts as a root stimulant (and it is known that certain closely related hydrocarbons such as chlordane will cause a very definite elongation of roots while others such as benzene hexachloride will stunt their growth) and at the same time protects the young tree while it is getting established, trees treated with aldrin should be larger than untreated. And they are. Washing of the roots in one instance showed that the roots from a treated tree extended beyond the adjacent untreated row. So aldrin treated trees may be in a better position to compete for nutrients and moisture. However, this does not explain why the untreated trees lying between rows sprayed with one percent aldrin are larger than those between rows receiving one-half percent.

If the aldrin is repellent and its repellency has a direct ratio to its concentration for both grubs and adults, the following would pertain:

1. Grubs not killed would be driven toward the untreated trees. This would result in rapid death of the trees.

2. Grubs in the area receiving one percent on treated rows would be driven more strongly to the untreated trees than in the area where one-half percent was applied. This should result in a greater proportion of trees being killed among the insecticide-free trees located between those which received the higher dosage. The facts seem to agree.

3. If aldrin is repellent to adult beetles, and they have a free choice of area in which to oviposit, fewer beetles should lay in the area receiving one percent than in that treated with one-half percent and more should deposit their eggs in an area receiving no aldrin. Comparison of the two treated areas with each other and with the untreated area lying adjacent to the one-half percent area indicates that such might have been the case (Fig. 8).

The combined action of the operation of a number of factors thus appears to offer the most reasonable explanation of what has occurred.

### Summary

The benefits from treating the roots of trees as they are transplanted into the field are very evident—but the explanation of the results is not yet so clear. It is also very apparent that the influence of the treatment goes far beyond mere comparisons of early mortalities. As a matter of fact, it now appears that it will be necessary to wait for the completion of harvest before the effects of the treatment can be fully assessed.

## Coming Events

**86th Annual AFA Meeting**

The American Forestry Association will hold its 86th annual meeting in Santa Fe, N. Mex., October 1-4. Headquarters will be the La Fonda Hotel. Theme of the meeting is "The Stewardship of Our Public Lands." Following a morning session on October 2, two and a half days will be devoted to field trips covering federal and state lands in the area. An annual banquet will conclude the meeting on October 4.

**New York Section Summer Meeting**

The summer meeting of the New York Section will be held at the Hotel Jamestown, Jamestown, N. Y., September 13-15. There will be a field trip and banquet on September 14 and a program including trips to furniture plants on the morning of September 15. There will be a meeting of the Executive Committee on the evening of September 13.

# Society of American Foresters Report on a Study of Seed Certification Conducted by the Committee on Forest Tree Improvement[1]

A SURGE of interest in improved forest tree seed and planting stock has developed in the United States in recent years. One aspect of this interest has to do with seed certification. To sample the thinking of those concerned with this question the Society of American Foresters' Committee on Forest Tree Improvement early in 1960 sent a special questionnaire to a large group of foresters, geneticists, and seed specialists. The results of that survey along with pertinent background material and subcommittee recommendations make up this report.

## Background

Despite general interest in seed certification relatively few foresters are well informed on the subject. It should be helpful in understanding what follows, therefore, to sketch the background in moderate detail.

*How agricultural seeds are certified.* — Agricultural seeds have been certified for a long time in the United States and there is a sound background of experience behind that activity. Essentially this is how it is done:

1. In most states there is an agency designated by law to certify agricultural seeds. In 42 states there is a "crop improvement association" responsible for seed certification.[2] These 42 agencies along with some in Canada are members of the International Crop Improvement Association (ICIA), a nonprofit organization founded in 1919. The latter body sets up minimum certification standards for each crop which the individual state standards must equal or exceed. Some states have seed certification bodies not affiliated with ICIA. They operate under their own local standards and regulations.

2. Each ICIA member association has committees of experts for each commodity (crop) group. (Forest tree seed, for example, would be a commodity group). These committees are responsible for the formulation and revision of standards and the recommendation of varieties to be certified. Although inspection and certification are administrative responsibilities of the association, the committees assist in training inspectors and make recommendations concerning inspections. Seed certification, in the eyes of the ICIA, is designed to maintain genetic purity of superior crop varieties and reasonable standards of seed condition and quality. Its purpose is "to maintain and make available to the public sources of high-quality seeds and propagating materials of superior varieties so grown and distributed as to insure genetic identity."[3] Quoting further, "Only those varieties that contain superior germ plasm are eligible for certification."

3. In states having an officially designated seed certifying authority the pertinent seed laws usually declare it illegal to sell, label, and expose or offer for sale seed called "certified," "registered," etc., unless the seed is so designated by the official certifying authority. These state laws, however, have no force outside their own boundaries, so there is a federal seed law concerning the labeling of agricultural and vegetable seed sold in interstate commerce. This law (Federal Seed Act, August 9, 1939, 53, Stat. 1275) defines "certified seed" as "seed that has been produced and labeled in accordance with the procedures and in compliance with the rules and regulations of an officially recognized seed—certifying agency." Such an agency was defined further in the act as being one "authorized under laws of a State—to officially certify seed." The basis for legal action is the transport across state lines of seed that is not what the label says it is, in accordance with the state law. Provision was also made in the act for recognizing certification agencies of foreign countries.

As written, the federal law does not cover labeling or certification of forest tree seeds. Negotiations have been under way to have them included, but it seems unlikely that the law will be so amended until foresters have expressed a strong feeling that such action is desirable in contrast to the "go slow" attitude now prevalent.

4. Under existing state laws seed certification is not mandatory. They merely make it unlawful to label seeds originating within the state as "certified" unless the seeds have been so designated by the authorized state certifying agency. Any collector or dealer can, of

[1]Members of the Seed Certification Subcommittee of the Committee on Forest Tree Improvement, Division of Silviculture, preparing this report were: William B. Critchfield, R. G. Hitt, Allan Orr-Ewing, A. E. Squillace, and Paul O. Rudolf, *chairman*.

The committee gratefully acknowledges the excellent cooperation of the many persons who completed questionnaires, offered comments, or gave other material assistance in connection with this study. Grateful acknowledgment is also made to R. T. Bingham for drafting the original questionnaire, and to John C. Barber and A. E. Squillace for their help in developing it; and to the latter for circulating the questionnaire, summarizing the results, and preparing the initial review draft of this report. Helpful guidance in preparing this report also was provided by these same members, R. M. Echols, and H. A. Fowells.

[2]States currently without listed "crop improvement associations" affiliated with ICIA include Connecticut, Florida, Hawaii, Louisiana, Maine, Massachusetts, New Hampshire, and Rhode Island.

[3]Minimum seed certification standards. Pub. No. 19. International Crop Improvement Association. August 1959. 111 pp.

course, sell seeds under personal, bonded, or other warranty, so long as his certification terminology does not encroach on those terms reserved for use of the officially designated agencies.

*The present status of forest tree seed certification.*—Four states now have the necessary machinery for forest tree seed certification. These are: Georgia, South Dakota, South Carolina, and New York. Most states have certification laws covering agricultural seeds and, in Georgia at least, forest tree seeds are blanketed under agricultural seeds and the single authorized certifying agency covers tree seeds along with the others. Other states could operate similarly, provided their laws do not exclude forest tree seeds.

In Georgia the commodity group responsible for forest tree seed certification under the Georgia Crop Improvement Association is the seed certification committee of the Georgia Chapter, Society of American Foresters. In New York the State College of Forestry is responsible for formulating the standards, while the New York Certified Seed Growers' Coop., Inc. (the local ICIA member) will administer the certification process. Late last summer the West Coast Seed Dealers' Association agreed to adopt voluntary seed certification based on standards set up by a western group (the "West Coast Tree Seed Certifying Authority, Inc."). Thus several pathways, both within and without ICIA are open for certification of forest tree seeds.

In October 1959 the ICIA adopted a set of minimum "forest tree seed certification standards" (Exhibit 1). This was the culmination of activity by several groups in the South in which the ICIA willingly cooperated by establishing a 6-man tree seed committee headed by Hugh A. Inglis of Georgia. This committee solicited advice from various interested groups throughout the nation but received little in the way of concrete suggestions. As developed later, most of these groups were unfamiliar with ICIA and did not realize that the adoption of minimum standards for forest tree seed certification was imminent. When these standards were circulated later, therefore, several of the groups, including the SAF Committee on Forest Tree Improvement, objected to them. One of the main objections to these standards was that they did not provide for certifying wild seed, and seed of that type will continue to make up the bulk of that used in forestry for at least the next several decades in most parts of the United States and Canada. The adopted minimum tree seed standards do require that geographic origin of seed be known for any seed being considered eligible for certification.

EXHIBIT 1.—FOREST TREE SEED CERTIFICATION STANDARDS[1]

I. APPLICATION AND AMPLIFICATION OF GENERAL CERTIFICATION STANDARDS.

1. The General Seed Certification Standards as adopted by the International Crop Improvement Association are basic and together with the following specific standards constitute the standards for forest tree seeds.
2. The general standards are amplified as follows to apply specifically to forest tree seed:
   (1) Section E (d). For certified seed for forest trees, the exact geographic source of the parent trees and the stand history must be known.
   (2) Section H. In all cases where seeds or other propagating materials are produced from planted or otherwise artificially established trees, the origin of the parent material must be known.

II. LAND REQUIREMENTS.

1. Site index (the soil capability of a given site to produce trees measured by the height of the tree at 50 years) and elevation shall be shown on the tag for all forest tree seed.

III. FIELD INSPECTIONS.

1. A field inspection must be made each year that a certified crop is to be produced.
2. For the production of seed an initial inspection must be made prior to flowering.
3. A seed crop automatically becomes ineligible for certification if all off-type individuals are not removed prior to flowering.

IV. FIELD STANDARDS.

1. General
   (1) Unit of Certification.
   An individual tree, clone or stand of trees may be certified.
   (2) Isolation.
   An adequate isolation zone shall be maintained free of off-type plants and other species which might cross-pollinate producing trees. The distance shall be set for each variety or species by the certifying agency.
2. Specific requirements.
   (1) There shall be no tolerance for off-type plants.
   (2) All clones used in seed orchards shall be progeny tested.

V. SEED STANDARDS.

| *Factor* | *Standard* |
|---|---|
| Pure seed (minimum) | 95%* |
| Other species (maximum) | 0% |
| Inert matter | 5%* |
| Germination (minimum apparent) | 75%* |

[1]Forest trees include all species normally used in forestry including specialized products or uses such as Christmas trees, shelterbelts, etc.

*Exceptions may be made contingent on inherent characteristics of species involved.

## A Survey of Opinion

Objections of some forestry groups to the minimum standards for forest tree seed certification brought the response from ICIA that annual revisions of the standards were possible and that they would welcome recommendations for that purpose. Consequently, the SAF Committee on Forest Tree Improvement, through its Subcommittee on Seed Certification, prepared a questionnaire and early in 1960 sent it to 123 organizations and individuals as follows: (1) Chairmen of all SAF Sections or chairmen of their seed certification committees where such committees existed, (2) chairmen of seed certification subcommittees of various regional forest tree improvement committees, (3) a representative group of specialists in forest genetics, and (4) a representative group of tree seed dealers.

Ninety-six replies to the questionnaire were received distributed regionally as follows: Northeast, 12; Midwest, 23; West, 25; South, 25; and Canada, 11. They should, therefore, provide a good sample of the opinions of qualified persons countrywide. The importance of the forest tree seed trade varies

widely between sections and the problems also may be very different. To a great extent, therefore, some answers to the questionnaire reflected regional differences in need, although respondents were asked to answer the questions on a national or international basis.

About one-fourth of the questionnaires returned were from seed dealers or large-scale buyers of seed. As a group their votes followed the same pattern as that of the entire 96 who replied.

Results of this poll of opinions follow:

1. Ninety-seven percent of the replies favored some sort of forest tree seed certification service. Forty-seven percent felt this need was pressing at present; 42 percent that it would be within the next few years; and 11 percent (mostly from the Northeast and Canada) foresaw no need for certification for several to many years to come.

2. Opinion was overwhelmingly (93 percent) in favor of voluntary certification by a nonprofit, nongovernmental agency. Eighty percent favored certification administered through ICIA and its member associations. Among westerners alone, however, 50 percent favored certification by some other means. This apparently reflects present western activities toward developing a regional certification authority administered entirely by foresters and tree seed dealers. Many persons suggested emphatically that those who develop standards or serve as certifying inspectors should be professional foresters. This would be in line with existing programs in the South in all of which foresters developed the standards, handle all technical matters, and serve as inspectors.

3. All those replying to the questionnaire favored including taxonomic identity, (65 percent of them down to variety or cultivar) on a label. All thought that the geographic source of seed should be shown, with as many as 62 percent favoring pinpointing source down to the section or similar land subdivision, and 48 percent being in favor of showing source down to the quarter section. Eighty-four percent favored certifying source of specific stands, seed production areas, seed orchards, and individual clones where applicable. Ninety-nine percent wanted elevation shown, 65 percent of these to the nearest 500 feet. One hundred percent wanted year of seed collection shown; 92 percent, the results of a germination test; 91 percent, the name and address of the collector; 98 percent, the name and address of the seller.

4. Fifty-eight percent (mostly from the West, Midwest, and Canada) favored incorporating wild seed into certification programs and practically all of these (98 percent) would do so even if the ICIA should be unable or unwilling to offer such wild seed origin verification service. Of those who preferred not to verify wild seeds, 57 percent (mostly from the South and Midwest) were in favor of mandatory labeling laws covering geographic origin of seed. Many suggested that wild seed be given some designation other than "certified seed," such as "selected seed," or "verified seed," etc.

5. Sixty percent found the present ICIA minimum standards unacceptable for various reasons, but 91 percent believed they provided a good basic framework from which to work toward more generally acceptable minimum standards. All 5 major parts of the present ICIA minimum standards were believed in need of revision by from 70 to 82 percent of the voters.

6. Eighty-four percent thought that government forest experiment stations should be included among agencies which could approve varieties as being eligible for certification. Seventy-one percent thought that regional Forest Tree Improvement Committees should likewise be included. Whether or not these organizations could or would be willing to participate in this respect is not known.

7. Eighty-eight percent believed that the four seed classes used in agricultural crops, "Breeder, Foundation, Registered, and Certified," were generally nonapplicable to forest tree seed. From 63 to 78 percent favored such categories as "wild seed, seed from silviculturally improved stands, seed from specially improved seed production areas, seed from untested seed orchards, seed from progeny-tested seed orchards, seed from untested single trees, and seed from tested single trees." Many, however, remarked that the number of classes should be held to a minimum for simplicity, and suggested broader groups.

8. Fifty-two percent wanted precollection inspections to verify that a cone and seed crop was present and to estimate its potential yield. Many remarked, however, that only one inspection per year, or even less often, should be sufficient.

9. Fifty-three percent (50 percent or more for all regions but Canada) were not interested in having site index of the collection area specified.

10. Seventy percent wanted the term "off-type plants" more adequately defined or relegated to state standards. Sixty-eight percent wanted "progeny testing" more adequately defined and 74 percent wanted it clearly spelled out so that no claims for improvement could be made without the degree of improvement having been verified by an agency-approved progeny test. Fifty-nine percent wanted seed quality standards revised to cover individual species or groups of species.

These are the skeleton results of the questionnaire, which also yielded many very pertinent side comments. Although these remarks and comments do not lend themselves to a tabulation, they did serve to inform the subcommittee of many points not considered by all persons and were of great help in formulating opinions and making recommendations.

In summary, the questionnaire showed that most of those contacted thought that certification is desirable now or in the near future, and that it should be tied in with the ICIA. Most also wished to include wild seed and a strong majority desired a revision of standards to define terms more adequately and to reflect conditions countrywide.

### Discussion

The ICIA and similar agencies

dealing with agricultural seeds have restricted the term "certified" to apply only to genetically improved seed. Many foresters and some foreign certifying agencies[4] have used the term in a much broader sense. To avoid confusion, however, it seems desirable to confine the use of "certification" to that meaning given to it by agricultural agencies, unless they are willing to accept the more inclusive meaning used by most foresters. A check with the ICIA Tree Seed Committee in November 1960 indicated that they would be willing to use the word "certified" in a compound term for some categories of seed not proved to be genetically improved. They were unwilling to use the term "verified" for wild seed, because that term already has been used in another sense.

For obvious reasons certification of forest tree seed probably will be much more difficult to carry out than that of agricultural seed. This will be particularly true of wild seed. It may be possible, however, to work out some sort of a system by which seed purchasers could obtain information on seed available, reliable collectors, etc. through the certifying agency. The ICIA, incidentally, periodically publishes a directory of dealers of forest tree seed. In any event it is obvious that in certifying forest tree seeds, inspections may be more difficult and costly to make than for agricultural crop seeds and that special procedures may have to be worked out for wild seed.

Verification of geographic origin through mandatory labeling laws was favored by a small majority of questionnaire returns, but many others commented unfavorably upon them. The latter group doubted the practicality, for example, of obtaining reliable information on seed quality and even elevation of the seed source. Stringent laws, in the opinion of this group, would fail because of the difficulty of checking the facts and because they might foster unscrupulous practices. It appears that tree seed labeling, if adopted, should be kept within the realm of feasibility and practical enforcement.

Another point needs clarification concerning verifying geographic origin. For planted stands a term like "native habitat" may be more appropriate to distinguish it from the "geographic origin" of natural stands. The native habitat refers to the locality of origin of the original parent stands of plantations. It should be recorded whenever possible.

Although generally not true, certification of tree seeds from genetically proven material may in some instances be confirmed as early as for agricultural crops. For example, where the superior material is supposed to be rust-resistant white pine, the buyer of seed may have a check on his purchase within a few years. The same may be true for a few other traits.

Many foresters think that the wise forest manager will collect or produce his own seed. This is true and is being done to a large degree in many parts of the country. However, as pointed out by others in the questionnaire, many seeds do exchange hands and some sort of certification is desirable, both to aid buyers in attempting to get what they want and to stimulate wise choice and use of seed.

Since the questionnaire was circulated a report representing the view of some western foresters has been presented to the Fifth World Forestry Congress.[5] It suggests three grades for wild seed and four grades for "genetically-improved" seed. These grades are reported by Swedish foresters to be similar to some used in their country. This report also suggests the formation of an independent "Western Forest Seed Authority" for the certification of forest tree seed in western North America. It would include representatives of forest seed dealers and of industrial, state, and federal forestry agencies.

At the World Forestry Congress also there was opportunity to discuss seed certification with delegates from a number of European countries that buy the bulk of American seed sold abroad. They are interested primarily in seed of western conifers. Several were somewhat apprehensive that the scheme proposed for the West would result in higher prices (to pay for "certification") for seed no better than they are getting now without "certification." They did not see how wild seed could be inspected adequately to assure genuine certification without involving inordinately high costs. They felt that the seller should bear the major costs of certification but that the buyer should have the major voice in certification. Their opinion seemed to be that anything short of complete certification would be worse than none.

More recent information indicates that some, at least, of the major European forestry agencies buying West Coast tree seed would support the idea of the "Western Forest Seed Authority" if it met the following conditions: (1) The "Authority" were responsible to an outside recognized international body, preferably the ICIA; (2) the "Authority" and their "certifiers" were approved by responsible professional bodies, including the Society of American Foresters and the Western Forestry and Conservation Association; (3) the composition of the controlling body were revised to include a representative of the seed buyers, the U. S. Forest Service, and the Western Forestry and Conservation Association.

The opinions of these European foresters merit consideration by American foresters and this subcommittee in particular. Some western foresters, on the other hand, can present strong arguments for their points of view.

### Recommendations

Based on the results of the questionnaire and consultation with other foresters the subcommittee makes these recommendations concerning forest tree seed certification:

[4] The Scottish Forest Tree Seed Certification Association, for example, "certifies" wild seed.

[5] Isaac, Leo A. Problems and proposals for international certification of tree seed origin and stand quality with particular reference to western North American species. Fifth World Forestry Congress Preprint GP/51/11/A. 12 pp. 1960. (Processed.)

EXHIBIT 2.—SUGGESTED REVISED FORM, WHICH INCLUDES RECOMMENDATIONS OF THE TREE IMPROVEMENT COMMITTEE, SOCIETY OF AMERICAN FORESTERS, FOR THE INTERNATIONAL CROP IMPROVEMENT ASSOCIATION MINIMUM STANDARDS FOREST TREE SEED CERTIFICATION STANDARDS[1]

I. APPLICATION AND AMPLIFICATION OF GENERAL CERTIFICATION STANDARDS.

A. The General Seed Certification Standards as adopted by the International Crop Improvement Association are basic and together with the following specific standards constitute the standards for forest tree seed.

B. The general standards are amplified as follows to apply specifically to forest tree seed:

1. In addition to those specified in Section C of the general standards, varieties approved by State agricultural or Governmental forest experiment stations and Regional tree improvement committees shall be eligible for certification.

2. In addition to the classes and sources of seed recognized under Section E of the general standards, the following additional classes shall be recognized for forest tree seed.

a. Selected tree seed.
Selected tree seed shall be seed from untested parentage of rigidly selected trees or stands that have promise but not proof of genetic superiority.

b. Source-certified tree seed.
Source-certified tree seed shall be seed from (1) natural stands with the geographic origin known and (2) from plantations of known provenience, as specified in the standards of the various certifying agencies.

c. Certified seed as defined in the general standards shall be interpreted to include interspecific hybrids of forest trees.

3. For all classes of forest tree seed, the exact geographic source of the parent trees and the stand history must be known. Location of the source should be given at least down to the section or comparable land survey unit.

4. In all cases where seed or other propagating materials are produced from planted or otherwise artificially established trees, the origin of the parent material must be known.

5. In addition to the qualifications for inspectors as set forth in Section I of the general standards, inspectors for forest tree seed shall be professional foresters or persons trained specifically for the job by such foresters.

6. Seed testing standards as covered in Section O of the general standards will not be applicable for all species of forest trees. For seed of species not covered by the rules of the Association of Official Seed Analysts, the analyses and tests of samples of seed shall be in accordance with the standards of various State and Governmental laboratories.

II. LAND REQUIREMENTS.

A. Elevation to the nearest 500 feet of native habitat and the average height and age of the trees (the ortets in the case of clonal orchards) from which collected shall be shown on the tag for all forest tree seed. If available, site index (the capability of a given site to produce trees as measured by the height of the trees at a specified age) may be recorded instead of tree height and age.

III. FIELD INSPECTIONS.

A. For certified and selected seed at least one field inspection shall be made prior to pollination. At this time compliance in regard to roguing and isolation as covered by the applicable agency standards will be checked. For all classes of seed, an inspection will be made prior to seed maturity and the size of the crop will be estimated.

IV. FIELD STANDARDS.

A. Unit of Certification.
An individual tree, clone, or stand of trees may be certified in producing certified, selected, or source-certified seed.

B. Isolation.
For certified or selected seed, an adequate isolation zone shall be maintained free of off-type plants and other species which might cross-pollinate producing trees. The isolation distance and specifications for off-type plants shall be set for each variety or species by the certifying agency. There shall be no requirement for source-certified seed.

C. Specific requirements.

1. There shall be no tolerance for off-type plants as defined in the agency standards for the production of certified or selected seed.

2. All clones used in seed orchards shall be progeny tested.

V. SEED STANDARDS.

The following standards apply specifically to seed of the southern pines:

| *Factor* | *Standard* |
|---|---|
| Pure seed (minimum) | 95%* |
| Other species (maximum) | 0%* |
| Inert matter | 5%* |
| Germination (minimum apparent) | 75%* |

[1]Forest trees include all species normally used in forestry including specialized products or uses such as Christmas trees, shelterbelts, etc.

*Exceptions may be made contingent on inherent characteristics of species involved. Standards for other species and/or groups of species will be included as they become available.

1. Activities leading toward certification in the United States and Canada should be encouraged but caution must be exercised. Certification at present is not urgent enough to warrant haste. Pilot trials of different methods should be undertaken. Meanwhile it seems inadvisable to rush for tree seed legislation until foresters are better informed and have developed sound opinions and until state, regional, and national forestry groups have developed certification policies.

2. Certification of forest tree seed as a part of the ICIA program is generally but not exclusively acceptable providing (1) that the ICIA can in some manner provide for verification of the geographic origin of wild seed, and (2) that the ICIA can give assurance that foresters will play a prominent role in developing standards and in carrying out inspection services.

3. The present adopted ICIA minimum forest tree seed certification standards should be revised to:

a. Reserve the term "certified seed" to apply to genetically superior material, produced so as to assure genetic identity, and use other terms such as "verified seed," "source-verified seed," "selected seed," or use modified terms such as "source-certified" for other seeds.

b. Provide for verification of the geographic origin of wild seed.

c. Specifically provide for inclusion of genetically superior hybrids.

d. Exclude mandatory requirements as to site index, but preferably include information on the height and age of the seed trees.

e. Keep standards as simple and broad as possible. Definition of such terms as "off-type." "progeny testing" should be relegated to state standards as needed.

f. Include specific requirements as to isolation and seed standards only where basic information is available. These can be included in state standards, preferably for groups of species, and included in the international minimum standards as required information becomes available.

4. Requirements in seed labeling laws, where such laws are used

in lieu of certification laws, should be held to a minimum and kept well within the realm of feasibility.

5. The international aspects of the seed trade and certification standards should be kept in mind and every reasonable effort expended to develop worldwide standards as uniform as possible.

These general recommendations were presented to ICIA on November 2, 1960, with specific suggestions concerning each item in the minimum standards of 1959 (Exhibit 1). Based on suggestions of the ICIA Tree Seed Committee a mutually satisfactory revision of the 1959 minimum standards has been worked out (Exhibit 2). It will be acted upon at the annual ICIA meeting in the fall of 1961 and indications are it will be accepted at that time. Future revisions, as they seem desirable, can be made by a similar procedure.

In conclusion, we suggest that readers who want to evaluate this report keep in mind three things: (1) Whether we certify identity and purity of genetically improved seed or merely the exact geographic origin of "wild" seed from natural stands our primary objective is to provide for improved planting stock. (2) Although the actual production of genetically improved seed may be quite limited for some time to come, now is the time to establish the best standards we can for its production and use. (3) We are faced with an accomplished fact. Minimum standards for forest tree seed certification already have been issued by the ICIA, but they are willing to modify them. If we do not accept responsibility for proposing revisions someone else probably will, and the results may not be to our liking.

**Walter H. Horning (1892-1961)**

Walter Harold Horning, 69, of Portland, Ore., died on August 5. He had been chief forester for the Bureau of Land Management, U. S. Department of the Interior.

Born January 4, 1892, in Mifflintown, Pa., he was graduated from the old Pennsylvania State Forest Academy in 1914, and from the University of California with the M.S. degree in 1928.

He began his forestry career in 1914 with the Pennsylvania Department of Forestry. During World War I he spent two years overseas with the 20th Engineers (forestry). In 1920 he became instructor, later assistant professor, at the Pennsylvania State Forest School, and served also as forester of the Mont Alto district of the State Forest Service.

He became assistant professor of forestry at Iowa State College in 1929, then from 1935 to 1938 was employed by the National Park Service in Washington and California. In the latter year he was named chief forester for the 2½ million acres of O and C lands in Oregon, where he was largely responsible for technical and administrative procedures under the 1937 O and C Act, administered by the Department of the Interior.

With broadened responsibilities he became regional administrator in 1947 of all public lands under the Bureau of Land Management in Idaho, Washington, and Oregon. Two years later he was promoted to forestry staff officer in the BLM where he was until May 1961 chief adviser to the director for the 36 million acres of forest in the United States outside of Alaska and 125 million acres in Alaska.

At the time of his death Horning was living in Portland, Ore., where he had been given a special assignment to evaluate BLM activities in western Oregon with special reference to O and C lands.

In 1954 he received the distinguished service award of the U. S. Department of the Interior.

Mr. Horning has been a SAF member since 1923.

# The Effect of Fertilization on Four Wood Properties of Slash Pine[1]

**Robert F. Williams and John R. Hamilton**

INTEREST in fertilization of forest trees has increased markedly in recent years. While this interest has generally been focused upon the possibility of improving wood yield, there has also been speculation that fertilization might provide a means of modifying wood properties.

For the purpose of exploring this last possibility a study was started in the winter of 1959 to evaluate the effects of high level inorganic fertilizer applications to the soil on the ring width, percentage of late wood, specific gravity, and early wood tracheid wall thickness of plantation grown slash pine (*Pinus elliottii* Engelm.) The fertilizer treatments used were 600 pounds of ammonium nitrate per acre, 500 pounds of 20 percent superphosphate per acre, and these two together.

## Previous Work

Many studies have demonstrated that increased rates of tree growth have resulted from the application of fertilizer to areas on which forest trees were established. For example, McGregor (*7*) found that 500 pounds of nitrogen per acre increased the growth of slash pine by 36.6 percent. Cloud (*2*) working with 10-year-old slash pine found an even greater increase in radial growth following application of 50 pounds of ammonium nitrate per acre. Roth and Evans (*10*) concluded that a complete fertilizer augmented by a nitrate of soda supplement increased diameter growth more than any of the inorganic nitrogenous fertilizers alone. Gilmore and Livingston (*4*), in contrast, although observing an increase in growth rate as a result of light applications of NPK, could find no significant increase in pulpwood volume after nineteen growing seasons.

On the other hand, there is little direct experimental evidence to support the thesis that supplemental inorganic fertilizers contribute to a modification of coniferous wood properties. One of the few exceptions to this is found in the work of Wilde and Voigt (*14*) with jack pine (*P. banksiana* Lamb.). They reported that seedlings from a cutover area with coarse sandy soils exhibited a higher specific gravity than seedlings from a heavily fertilized nursery bed.

That environmental factors, or more specifically edaphic factors including soil fertility, may influence wood structure, and therefore wood properties, is further illustrated by the classic work of Hartig (*6*). His nourishment theory asserts that specific gravity of wood depends upon the relationships between soil fertility, transpiration, and assimilation. He held also that the anatomical structure of wood conforms "to the needs" of the tree as influenced by external conditions.

Schrader, Allen, and Hughes (*11*) reported the quality of cell wall material formed during growth to be strongly influenced by site, and concluded that wood with greater strength was produced on more fertile sites. Van Buijtenen (*13*) reported a significant increase in cell wall thickness when woody plants were subjected to low night temperatures, which suggests that the availability of nutrients to the cambium plays an important role in cell wall formation.

From this limited work it may be inferred that soil fertility does affect wood properties but quantitative evaluation of these effects is not generally available in the literature.

## Method of Study

Material for this study was obtained from a slash pine plantation established in 1949, at a 6 x 6-foot spacing, in the Lower Coastal Plain near Valdosta, Georgia. In 1957, a fertilization experiment was set up in the plantation to evaluate the effects of high-level nitrogen and phosphorus applications on diameter and height growth of this species.[2] A randomized block design with four replications was used. Individual plots were one-tenth acre in size. The fertilizer was broadcast on one plot in each replication at the prescribed rates. One plot in each replication was not fertilized.

*Field procedure.*—Sample increment cores 10 mm. in diameter were taken from a restricted random sample of 17 trees from each plot. The restriction imposed was that each sample of 17 trees contain 6 dominant, 8 codominant, and 3 intermediate or suppressed trees. Sample material was obtained in

THE AUTHORS are, respectively, graduate assistant (now forester, U. S. Forest Service, Savannah River Plant), and associate professor, School of Forestry, University of Georgia, Athens.

[1]This research was supported by a grant-in-aid from the National Plant Food Institute and by the Georgia Forest Research Council. Published with the approval of the director as Journal Paper Number 143 of the College Expt. Sta., Athens, Ga.

[2]Original fertilizer application and design of experiment made by C. T. Youngberg of Monsanto Chemical Company on the lands of the Langdale Company.

December of 1959, two complete growing seasons after fertilization. Two full radius cores from opposite locations in the bole were taken from each tree at 3 feet above ground level. The location on the circumference for extraction of the first core was randomly determined and was moved only to avoid knots and other defects. Cores were preserved in the fresh condition in vials of distilled water immediately after extraction.

*Laboratory procedure.*—Ring width and percentage of late wood were determined microscopically for the two growth increments following fertilization, using a modification of a technique developed by Hamilton and Bethel (*5*).

The specific gravity of these two-year segments was determined by the maximum moisture content method developed by Smith (*12*). Early wood tracheid wall thickness was measured at the mid-point of macerated fibers with a filar micrometer. Preliminary studies had indicated that 35 wall thickness measurements per tree were sufficient for the degree of accuracy desired.

In determining specific gravity, ring width, and the percentage of late wood, values from both increment cores were combined to give an average value for the tree. Wall thickness measurements were made from tracheids randomly chosen from the mass of pulp resulting from the maceration of early wood tissue.

*Statistical analysis.*—Stand densities varied to some extent from plot to plot. Because such variation in stand densities could result in unequal competition between trees in different treatments, this factor was evaluated by means of correlation analysis. The results of this analysis failed to demonstrate a significant effect of stand density and accordingly this factor was dropped from the experiment. The standard analysis of variance procedure was used.

Treatment response may be influenced by tree vigor, as indicated by preliminary analysis; therefore, a split-plot analysis was employed using 3 crown classes. The final statistical treatment was a $2^2 \times 3$ factorial in a split-plot randomized block design with four replications.

## Results and Discussion

The addition of fertilizers had a definite effect on wood properties (Table 1). Average ring width for trees growing on unfertilized plots was 1.953 mm., whereas average ring width for those trees receiving fertilizer was 2.455 mm., or an increase of 26 percent. The percentage of late wood was reduced by 2.8 percent—from 50.6 percent on unfertilized plots to 47.8 percent on those receiving fertilizer. In like manner specific gravity was lowered by 0.0342 points from 0.5132 to 0.4790 or 6.7 percent. The average early-wood tracheid wall thickness on unfertilized plots was 6.543 microns as compared to 6.262 microns on the fertilized plots or a difference of 5.8 percent.

The observed increase in ring width and the decrease in percentage of late wood and specific gravity were significant at least at the 5 percent level of probability (Table 2). The decrease in tracheid wall thickness was not significant.

All fertilizer treatments caused an increase in ring width and a decrease in late wood percentage and specific gravity. Greater ring widths and smaller late wood percentages were associated with the combination treatment rather than with either nitrogen or phosphorus alone. The second most effective treatment was nitrogen, and the least effective was phosporus. When the reduction in specific gravity is considered, the order of magnitude of the effectiveness of the treatments was nitrogen, combination, and phosphorus.

These individual treatment effects were examined statistically by a breakdown of the significant treatment means (Table 2). The effects of the three fertilizer treatments were the same for each of the three wood properties. Applications of nitrogen significantly increased ring width and decreased the percentage of late wood and specific gravity from that of the unfertilized plots. The addition of phosphorus alone produced no significant change in these wood properties. The combination treatment did not contribute to a change in wood properties beyond that made by the addition of nitrogen alone.

Nitrogen had the greatest effects on growth and wood properties

TABLE 1.—A SUMMARY OF THE RESULTS OF THREE FERTILIZER TREATMENTS ON FOUR WOOD PROPERTIES OF SLASH PINE

| Treatment | Crown class: Dominant | Codominant | Intermediate and suppressed | Treatment means |
|---|---|---|---|---|
| | Ring width (millimeters) | | | |
| n | 3.250 | 2.557 | 1.677 | 2.495 |
| p | 2.320 | 2.260 | 1.617 | 2.066 |
| n + p | 3.440 | 2.935 | 2.035 | 2.803 |
| Mean | 3.003 | 2.584 | 1.776 | 2.455 |
| Control | 2.487 | 1.955 | 1.417 | 1.953 |
| | Percentage of late wood | | | |
| n | 46.6 | 48.3 | 46.4 | 47.1 |
| p | 50.6 | 49.7 | 48.5 | 49.6 |
| n + p | 48.0 | 45.5 | 46.4 | 46.6 |
| Mean | 47.7 | 47.8 | 47.1 | 47.8 |
| Control | 49.7 | 51.6 | 50.4 | 50.6 |
| | Specific gravity | | | |
| n | 0.4840 | 0.4593 | 0.4425 | 0.4619 |
| p | 0.5316 | 0.4991 | 0.4680 | 0.4996 |
| n + p | 0.4935 | 0.4697 | 0.4634 | 0.4755 |
| Mean | 0.5030 | 0.4760 | 0.4580 | 0.4790 |
| Control | 0.5275 | 0.5303 | 0.4818 | 0.5132 |
| | Tracheid wall thickness (microns) | | | |
| n | 6.663 | 6.558 | 6.416 | 6.546 |
| p | 6.136 | 6.197 | 6.003 | 6.112 |
| n + p | 5.993 | 6.102 | 6.290 | 6.128 |
| Mean | 6.264 | 6.286 | 6.236 | 6.262 |
| Control | 6.258 | 6.716 | 6.555 | 6.543 |

since the nitrogen treatment was significantly greater than the control. This fact is further underscored by the lack of significance of the differences due to the phosphorus treatment and the combination treatment. The absence of an effect from additions of phosphorus indicates that this element was not a limiting factor in the soils involved in this study.

Although preliminary analyses had indicated the possibility of an interaction between crown class and the response to fertilizer treatment, later more refined analyses failed to substantiate such a relationship (Table 2). Ring width and specific gravity, however, do appear to be related to crown class; whereas, percentage of late wood and tracheid wall thickness do not.

The observed relationship between ring width and crown class is to be expected in even-aged southern pine stands. The relationship between crown class and specific gravity, without a commensurate relationship between crown class and late wood percentage and/or tracheid wall thickness, is not so readily understood. The apparent association between ring width and specific gravity is probably spurious since Perry and Wang (*9*), and Zobel and McElwee (*15*), have demonstrated that such a relationship is tenuous at best.

The major implication of this study is that nitrogen may be useful in increasing the rate of growth of slash pine provided a reduction in the percentage of late wood and specific gravity do not impose serious limitations. This combination of wood properties does not in itself limit the usefulness of such treatments, since the requirements of raw material quality vary widely depending both on the utilization process and the ultimate product.

TABLE 2.—THE ANALYSIS OF VARIANCE FOR THE EFFECT OF THREE FERTILIZER TREATMENTS ON FOUR WOOD PROPERTIES OF SLASH PINE

| Source of variation | Degrees of freedom | Mean square | F-value |
|---|---|---|---|
| **Ring width** | | | |
| Total | 47 | 0.4970 | |
| Main plot | 15 | 0.5437 | |
| Blocks | 3 | 0.2226 | |
| Treatment | 3 | 1.8518 | 8.6898* |
| Nitrogen | 1 | 4.9092 | 23.0370 |
| Phosphorus | 1 | 0.5317 | 2.4950 |
| N x P | 1 | 0.1146 | 0.5377 |
| Error (a) | 9 | 0.2131 | |
| Subplot | 32 | 0.5649 | |
| Crown class | 2 | 5.7549 | 51.2457* |
| Error (b) | 24 | 0.1123 | |
| **Percentage of late wood** | | | |
| Total | 47 | 3.769 | |
| Main plot | 15 | 5.684 | |
| Blocks | 3 | 5.703 | |
| Treatment | 3 | 14.236 | 5.037* |
| Nitrogen | 1 | 40.480 | 14.324* |
| Phosphorus | 1 | 2.000 | 0.707 |
| N x P | 1 | 0.230 | 0.082 |
| Error (a) | 9 | 2.826 | |
| Subplot | 32 | 1.717 | |
| Crown class | 2 | 1.170 | 0.352 |
| Error (b) | 24 | 3.318 | |
| **Specific gravity** | | | |
| Total | 47 | 0.0013 | |
| Main plot | 15 | 0.0023 | |
| Blocks | 3 | 0.0028 | |
| Treatment | 3 | 0.0064 | 9.143* |
| Nitrogen | 1 | 0.0170 | 24.286* |
| Phosphorus | 1 | 0.0001 | 0.143 |
| N x P | 1 | 0.0022 | 3.143 |
| Error (a) | 9 | 0.0007 | |
| Subplot | 32 | 0.0012 | |
| Crown class | 2 | 0.00082 | 5.857* |
| Error (b) | 24 | 0.0014 | |
| **Tracheid wall thickness** | | | |
| Total | 47 | 0.6059 | |
| Main plot | 15 | 1.8117 | |
| Blocks | 3 | 5.2837 | |
| Treatment | 3 | 0.7201 | 0.7071 |
| Error (a) | 9 | 1.0183 | |
| Subplot | 32 | 0.0874 | |
| Crown class | 2 | 0.0478 | 1.7318 |
| Error (b) | 24 | 0.0276 | |

*Probability ≤ 5 percent

Bisset and Dadswell (*1*) have demonstrated that there is a difference in tracheid length within annual rings of coniferous species—the early wood contains shorter elements than the late wood of the same annual ring. If this relationship holds true for the present study, the increase in ring width and decrease in late wood percentage, as a result of fertilization, would increase the amount of relatively short length fibers. When processes using defiberized wood are considered, one may speculate in the light of known facts, concerning the effects of growth stimulation through fertilization. The properties of experimental sheets made from pulps containing different length fibers have been shown to be dependent upon element length (*3*). Within limits, short tracheids are associated with higher bursting strength and lower tear resistance. Fold endurance was found to be lowest in pulps containing 100 percent late wood, therefore fold endurance could be improved to some extent by increasing the proportion of early wood. The early wood is made up of relatively thin walled tracheids when compared to late wood. Thin wall tracheids collapse more readily than thick wall tracheids, thus providing better bonding in sheet formation.

Higher yields in terms of total production are associated with increases in percentage of late wood and specific gravity. Mitchell and Wheeler (*8*) have estimated that a change of 0.01 of a unit of specific gravity reflects a 50-pound change in the dry weight of an average cord of southern pine pulpwood. If this may be extended to the present data the wood produced on the nitrogen and control plots, dis-

regarding differences in volume, would differ by 250 pounds per cord in favor of the unfertilized plot.

When timber and other whole wood products are considered, there is a strong positive correlation between strength properties and specific gravity. The inference may be made that since there was a reduction in specific gravity as a result of fertilization, a concomitant reduction in many of the strength properties would occur. If this is true, the effect should be evaluated for individual processes, for wood is put to many uses where high strength properties are not important criteria.

### Summary and Conclusions

Results from this study indicate that fertilizers may be useful silvicultural tools in increasing the rate of growth of slash pine in the deep sands of the Lower Coastal Plain of Georgia. Under these conditions trees receiving supplemental fertilizers produced annual diameter increments (during the two growing seasons following treatment) which were 26 percent wider than increments for the same period from unfertilized trees. Accompanying this increase in growth rate was a 3-7-percent reduction in both the percentage of late wood and specific gravity. No significant difference occurred in the wall thickness of early-wood tracheids between fertilized and unfertilized trees.

It was indicated for the conditions of this study that these changes were primarily due to the addition of nitrogen. Incorporation of phosphorus as a component of the fertilizer amendment had little or no effect.

Since the requirements of different wood utilization processes vary with respect to the physical and anatomical characteristics of their raw materials, it is difficult to assess all of the ramifications of supplemental fertilizer applications. In general, it may be said that for those industries utilizing whole wood, where high strength characteristics are not a factor, fertilization would apparently bring young stands into production at an earlier age and possibly reduce the length of a rotation. If strength in addition to size must be considered, then the reduction in percentage of late wood and specific gravity would be a deleterious factor provided the relationship between strength and specific gravity holds true in material of this nature.

Industrial processes which require the use of pulped wood vary as to their raw material specifications. For certain products and grades of products low density wood is desirable, whereas for other products and highest yields, high density wood is desirable. For these reasons the effect of these treatments should be evaluated in the light of individual process requirements.

### Literature Cited


1. BISSET, I. J. W., and H. E. DADSWELL. 1950. The variation in cell length within one growth ring of certain Angiosperms and Gymnosperms. Aust. Forestry 14(1):17-29.
2. CLOUD, M. C. 1950. Effect of nitrogen on the radial growth of southern pines. Master thesis. University of Georgia.
3. DADSWELL, H. E., and A. B. WARDROP. 1959. Growing trees with wood properties desirable for paper manufacture. Jour. A.P.P.I.T.A. 12:4.
4. GILMORE, A. R., and K. W. LIVINGSTON. 1958. Cultivating and fertilizing a slash pine plantation: effects on volume and fusiform rust. Jour. Forestry 56:481-483.
5. HAMILTON, J. R., and J. S. BETHEL. 1961. A photo-optical method for determining gross characteristics of wood. Jour. Forestry 59:373-374.
6. HARTIG, R. 1884. Das holz der deutschen nadelwalbaume. Berlin. Cited in Jour. Forestry 52:191-200.
7. MCGREGOR, W. H. 1957. Fertilizer increases growth rate of slash pine. U. S. Forest Service, Southeastern Forest Expt. Sta. Research Note No. 101.
8. MITCHELL, H. L., and P. R. WHEELER. 1959. The search for wood quality. For. Farmer 18(4):4-6.
9. PERRY, T. O., and CHI WU WANG. 1957. Second progress report of cooperative forest genetics research program. Univ. of Florida, School of Forestry. Research Report No. 4.
10. ROTH, E. R., and T. C. EVANS. 1958. Effect of soil amendments on growth of shortleaf pine. Jour. Forestry 56:215-216.
11. SCHRADER, O. H., J. W. ALLEN, and W. G. HUGHES. 1949. The trend in engineering. Univ. of Washington.
12. SMITH, D. M. 1954. Maximum moisture content method for determining specific gravity of small wood samples. U. S. Forest Products Lab., Report No. 2014.
13. VAN BUIJTENEN, J. P. 1958. Experimental control of environmental factors and their effect upon some aspects of wood anatomy in loblolly pine. Tappi 41(4):175-178.
14. WILDE, S. A., and G. K. VOIGT. 1948. Specific gravity of the wood of jack pine seedlings raised under different levels of soil fertility. Jour. Forestry 46:521-523.
15. ZOBEL, B. J., and R. L. MCELWEE. 1958. Variation of cellulose in loblolly pine. Tappi 41(4):167-170.


### Sign of the Times

A new milestone in national forest management was reached this year with the installation of Park-Ur-Self ticket vending machines at three major national forest campgrounds in California.

According to Regional Forester Charles A. Connaughton, the vending machine collection of fees for camping, picnicking, and boat launching is used on an experimental basis. Machines are installed at Plaskett Creek Campground, Monterey District, Los Padres National Forest; Almanor Campground, Lassen National Forest; and Ice House Camp, picnic and boat launching area on the Eldorado National Forest.

The camping and boat launching fee is $1 per day per unit. The charge for picnicking is 50c per day. An automatic gate has been installed at Pope Beach on Lake Tahoe. Charge per car is 50c per visit. Persons may still walk in to the beach area free of charge.

# The Grazed-Plant Method for Judging the Utilization of Crested Wheatgrass

H. W. Springfield

SEVERAL different methods of judging utilization of range grasses have been devised. Among the more commonly used methods are reconnaissance, ocular-estimate-by-plot, stubble height-volume, weight-measurement, grazed-plant, and primary forage plant. Each of these methods has certain advantages and disadvantages. The weight-measurement methods are considered to be the most accurate, but they usually involve much time and expense; consequently, they are regarded by some as rather unsuitable for judging utilization on extensive range areas (*3*). A reliable, rapid, easy-to-use method that can be employed by range managers on large areas is needed. For crested wheatgrass (*Agropyron desertorum* [Fisch.] Schult.), the grazed-plant method shows promise of meeting this need.

## Literature Review

The grazed-plant method (number of grazed plants expressed as percentage of total number of plants observed and converted to utilization by weight) is not new. It was first used in 1931 on western wheatgrass (*Agropyron smithii* Rydb.) range in Colorado, where the percentage utilization was shown to be directly related to the number of wheatgrass stems grazed (*13*). A test of the method in Idaho, however, showed it to be insufficiently accurate for measuring the utilization of thickspike wheatgrass (*Agropyron dasystachyum* [Hook.] Scribn.) (*8*). On the other hand, based on 7 years of forage utilization studies at Miles City, Montana, investigators claimed that percentage of plants grazed proved the most sensitive indicator of the degree of grazing use (*4*).

The grazed-plant method also proved satisfactory for measuring the utilization of perennial grasses on semidesert ranges in southern Arizona, where a straight-line relationship was shown between utilization by weight and percentage of ungrazed perennial grass (*10*). Earlier investigations by Canfield (*2*) on these same ranges indicated that the percentage of a grass stand grazed closer than a 2-inch stubble height was proportional to the percentage grazed to a height above 2 inches, and also to the ungrazed portion. Using Canfield's method, a range examiner can count the number of plants grazed to a stubble of 2 inches or less and determine from a graph the number of plants in the stand untouched by grazing animals. But the method does not provide for estimating utilization by weight from the counts of grazed plants.

Application of the basic features of Canfield's method to studies of fall grazing with cattle in New Mexico showed that, when crested wheatgrass was utilized 50 percent by weight, about 20 percent of the plants were grazed to a stubble height of less than 2 inches, while 40 percent of the individual plants remained ungrazed (*12*).

Another application of the grazed-plant method was reported from Wyoming, where the percentage of plants grazed was used to estimate utilization of Idaho fescue (*Festuca idahoensis* Elmer) (*5*). The relationship between utilization by weight and percentage of the total number of plants grazed was found to be curvilinear.

Detailed studies of the grazed-plant method were conducted in Montana on a range where species of the Palouse bunchgrass and mixed prairie associations were intermingled (*6*). Graphs for the most important grass species were prepared to show the relationship between utilization by weight and percentage of plants grazed. Highly significant correlations were found between the two methods. To further test the validity of the method, the graphs were applied to another area of similar vegetation. Results indicated that the grazed-plant method was satisfactory for determining utilization of bluebunch wheatgrass (*Agropyron spicatum* [Pursh] Scribn. & Smith), western wheatgrass, bluejoint reedgrass (*Calamagrostis canadensis* [Michx.] Beauv.), and needle-and-thread (*Stipa comata* Trin. & Rupr.), but unsatisfactory for measuring utilization of Junegrass (*Koeleria cristata* [L.] Pers.), and Sandberg bluegrass (*Poa secunda* Presl.).

## Sites and Methods Used

Data for testing the grazed-plant method on crested wheatgrass were obtained fom grazing studies conducted on experimental pastures at four sites in northern New Mexico. At all sites the seeded stand was predominantly crested wheatgrass. Environmental conditions at the study sites, together with years of data collection, are briefly summarized in Table 1.

A 20-acre crested wheatgrass seeding made in 1945 on Glorieta Mesa was divided into four pastures in 1948 and grazed in the fall at different intensities by cattle in 1948, 1949, and 1950.

At the Cebolla Mesa site, an area of crested wheatgrass seeded in

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1947 was divided into three pastures, which were grazed in the spring at different intensities by cattle from 1952 through 1958. The No Agua site was seeded in 1949, divided into three pastures in 1955, and grazed in the spring at different intensities by cattle from 1955 through 1958.

At the Tank Canyon site a 1950 seeding of crested wheatgrass was divided into twelve 5-acre pastures, which were grazed in the spring by sheep at different intensities in 1957 and 1958.

TABLE 1.—ENVIRONMENTAL CONDITIONS AND COLLECTION PERIOD

| Name of site | Vegetation zone | Elevation | Average annual precipitation | Years data were collected (inclusive) |
|---|---|---|---|---|
| | | *Feet* | *Inches* | |
| Glorieta Mesa | Woodland-plains Grassland transition | 7,200 | 14 | 1948-1950 |
| Cebolla Mesa | Sagebrush-woodland | 7,500 | 13 | 1952-1958 |
| No Agua | Ponderosa pine | 8,300 | 15 | 1955-1958 |
| Tank Canyon | Ponderosa pine—Sagebrush-woodland transition | 7,400 | 16 | 1957-1958 |

At all sites, data for evaluating the grazed-plant method were obtained by counting grazed and ungrazed plants on randomly located plots or transects (Fig. 1). Counts were made at the end of a 21- to 52-day grazing period in the spring at Cebolla Mesa, No Agua, and Tank Canyon; whereas the sampling was done at the end of a month-long grazing period in the fall at the Glorieta Mesa site. At the Cebolla Mesa and No Agua sites, counts of grazed and ungrazed plants were made on circular plots 9.6 square feet in size. At the Glorieta Mesa site the sample plots were 43.5 feet by 4 inches; at this site height measurements as well as counts were taken of grazed and ungrazed plants. Paced transects were used to obtain the counts of grazed and ungrazed plants at the Tank Canyon site. One hundred plants were recorded per transect and four transects were randomly located in each pasture. Paced transects also were tested on the Cebolla Mesa and No Agua sites in 1957 and 1958 for comparison with results obtained from the 9.6 square-foot plots.

Standards of utilization, with which the grazed-plant data were compared, were obtained by the difference method (*1*) at Cebolla Mesa, No Agua, and Glorieta Mesa. Air-dry yields of samples clipped from grazed plots were subtracted from the air-dry yields of samples clipped from plots protected from grazing by wire cages or exclosures. This difference in yield expressed as percent utilization by weight was used as the standard.

Randomly located 9.6 square-foot plots were used at Cebolla Mesa and No Agua; whereas at Glorieta Mesa plots were 43.5 feet by 4 inches. There were 45 random sampling plots on each of the Cebolla Mesa pastures and 24 on each of the No Agua pastures. At the Glorieta Mesa site, the yields from 20 randomly located plots open to grazing were compared with the yields from 20 ungrazed plots located at random within exclosures in each of the four pastures. Standards of utilization used at the Tank Canyon site were obtained by the ocular-estimate-by-plot method, following the procedures described by Pechanec and Pickford (*9*). A total of one hundred 9.6 square-foot ocular-estimate plots were located at random in each pasture.

Relationships between the percentage of the number of plants grazed and percentage of utilization by weight were calculated by correlation and regression analyses, according to procedures outlined by Snedecor (*11*).

Time records were kept to aid in evaluating the efficiency of the grazed-plant method.

## Results

A comparatively strong relationship was found between the percentage of the number of plants grazed and percentage utilization by weight. Correlation coefficients from the four sites expressing these relationships were statistically significant, as shown in Table 2.

Statistical tests indicated that the regression equations for the Cebolla Mesa and No Agua sites

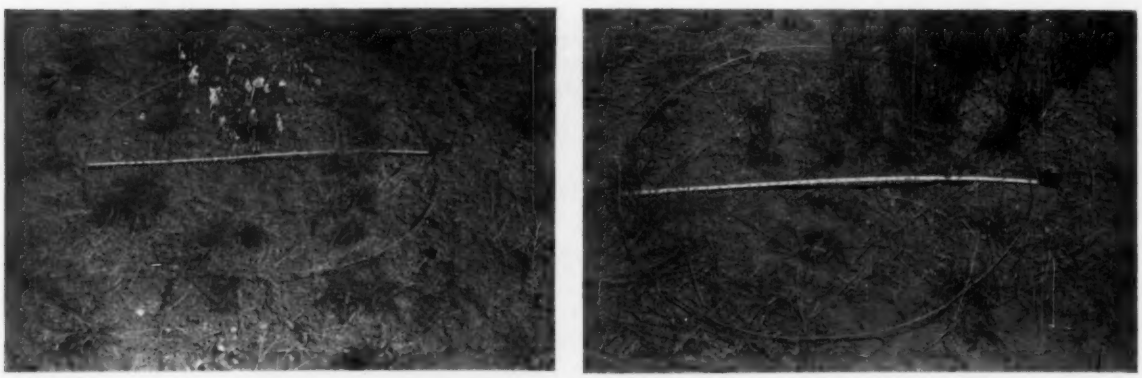

FIG. 1.—Representative sample plots on experimental crested wheatgrass range at the No Agua site. *Left:* plot showing that 100 percent of the number of plants were grazed; *Right:* plot showing that about 65 percent of the number of plants were grazed.

were similar and that a single overall equation best represented the data. The correlation coefficient for combined sites indicates that about two-thirds of the total variation in utilization may be explained by the percentage of the number of plants grazed. Though not as strong as for No Agua alone, the combined regression (Fig. 2) has greater value for estimating purposes, because it represents a wider range in soil and climatic conditions.

With the view to furnishing the range manager a more convenient means of obtaining numbers of grazed and ungrazed plants the paced-transect method also was tested at these sites in 1957 and 1958. Utilization percentages from plant counts taken on paced transects were computed by using the regression equation $Y = .742X - 2.41$. These percentages are compared with those determined by the difference method in Table 3. In general, the utilization percentages based on the percentage of the number of plants grazed agreed rather closely with those obtained by clipping and weighing samples from grazed and protected plots. These results not only indicate that the grazed-plant method is reasonably reliable, but also that paced transects provide satisfactory counts of grazed and ungrazed plants.

A comparison of the time required for the two methods indicates that the difference method is much more time consuming. Including the time required for installation of the cage and clipping and weighing the samples, the difference method took 25 minutes per cage, or a total of nearly 19 hours per pasture at Cebolla Mesa and 10 hours per pasture at No Agua for two range technicians. By contrast, the grazed-plant method required only 5 minutes per 100-plant transect for one technician, as summarized below:

| | Minutes required per 100-plant transect | | |
|---|---|---|---|
| | 1957 | 1958 | 2-year average |
| Cebolla Mesa | 6.00 | 4.05 | 5.02 |
| No Agua | 5.56 | 4.53 | 5.04 |

Totals were about 1¼ hours for 15 paced transects per pasture at Cebolla Mesa and about ¾ hour for 10 transects per pasture at No Agua. In other words, the grazed-plant method took less than 1/25 as many man-hours per pasture as required for the difference method.

The regression equation for the relationship between the percentage of the number of plants grazed and utilization by weight of crested wheatgrass for spring sheep grazing at Tank Canyon was significantly different from the equation for spring cattle grazing. The two regression equations indicate the following utilization percentages for different percentages of the number of plants grazed in the spring.

| Percent of plants grazed | Utilization by weight | |
|---|---|---|
| | Cattle | Sheep |
| | (Percent) | (Percent) |
| 40 | 27 | 10 |
| 50 | 35 | 21 |
| 60 | 42 | 32 |
| 70 | 50 | 43 |
| 80 | 57 | 54 |
| 90 | 64 | 65 |
| 100 | 72 | 76 |

These comparisons suggest that, at the relatively light degrees of utilization, cattle grazed fewer plants than were grazed by sheep; whereas within the range of about 55 to 65 percent use, both kinds of livestock grazed nearly the same number of plants. Apparently the sheep removed a much smaller proportion by weight of each plant grazed under the lighter intensities of grazing, as compared with a larger amount removed from each plant by the cattle.

The regression equation for fall cattle grazing at Glorieta Mesa was significantly different from the equation for spring grazing by cattle. Percentage of the number of plants grazed and utilization by weight were highly correlated ($r = .949$), and the regression line can be used for estimating utilization.

Under fall grazing, a significant relationship was found between utilization by weight and the percentage of the number of plants grazed to a stubble height of less than 2 inches. The relationship is a parabola-like curve (Fig. 3). For example, when 40 percent of the crested wheatgrass plants in a stand are grazed below a 2-inch stubble, the utilization by weight is about 70 percent, as shown by the curve.

TABLE 2.—RELATIONSHIP BETWEEN PERCENTAGE OF PLANTS GRAZED AND PERCENTAGE UTILIZATION BY WEIGHT

| Experimental site | Season of grazing | Kind of animals | Number of years of data | Correlation coefficient | Regression equation |
|---|---|---|---|---|---|
| Cebolla Mesa | Spring | Cattle | 7 | .745**[1] | .654X+ 3.81 |
| No Agua | Spring | Cattle | 4 | .925** | .851X— 9.58 |
| Cebolla Mesa and No Agua (combined) | Spring | Cattle | [2] | .827** | .742X— 2.41 |
| Tank Canyon | Spring | Sheep | 2 | .918** | 1.101X—34.14 |
| Glorieta Mesa | Fall | Cattle | 3 | .949** | .850X— .15 |

[1] **Indicates significance at the .01 probability level.
[2] Same number of years as listed for items 1 and 2.

## Discussion and Conclusions

Results of studies indicate the grazed-plant method has merit as a reliable, rapid, easy-to-use method for judging the utilization on

TABLE 3.—COMPARISON OF RESULTS BY METHOD

| Pasture | Year | Utilization by weight | | | |
|---|---|---|---|---|---|
| | | Cebolla Mesa | | No Agua | |
| | | Grazed-plant method | Difference method | Grazed plant method | Difference method |
| | | *Percent* | | | |
| Lightest-grazed | 1957 | 42 | 44 | 42 | 42 |
| | 1958 | 36 | 45 | 33 | 27 |
| Medium-grazed | 1957 | 67 | 68 | 67 | 52 |
| | 1958 | 52 | 57 | 44 | 38 |
| Heaviest-grazed | 1957 | 70 | 72 | 70 | 70 |
| | 1958 | 61 | 66 | 70 | 79 |

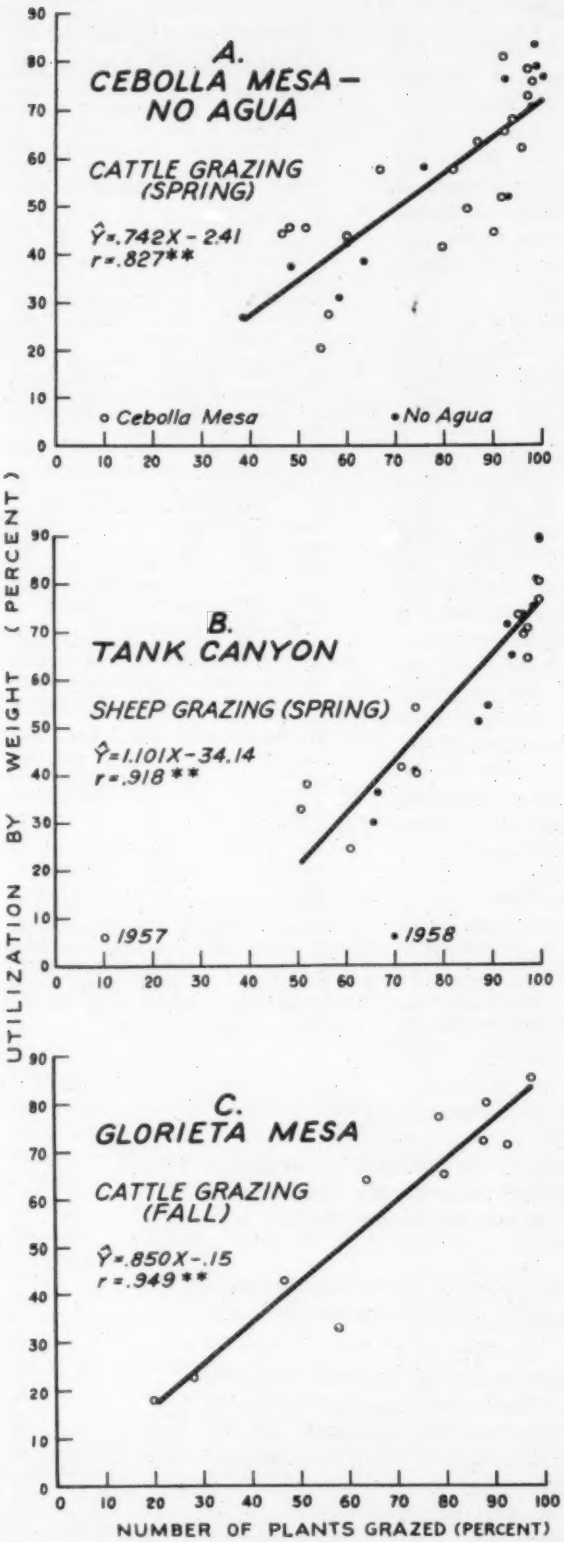


FIG. 2.—Relationships between the percentage of the number of plants grazed and percentage utilization by weight of crested wheatgrass. *A*. Spring cattle grazing at Cebolla Mesa and No Agua. *B*. Spring sheep grazing at Tank Canyon. *C*. Fall cattle grazing at Glorieta Mesa.

spring and fall ranges seeded to crested wheatgrass in New Mexico. The basic concept implicit in the method—that utilization by weight is a function of the percentage of the number of plants grazed—seems reasonably sound.

Separate regression lines will be needed for spring and for fall grazing by cattle because of differences in the grazing habits of the cattle. Observations indicated that the cattle were highly selective in their grazing of crested wheatgrass in the fall when plants were mature; some plants were grazed very closely but other plants were not cropped at all. On the other hand, the cattle appeared less discriminating in their choice of plants in the spring, grazing the tops from a great many plants, leaving only a few ungrazed, and cropping few plants closely, except under the heaviest grazing intensities.

Sheep and cattle apparently differ in the way they graze crested wheatgrass in the spring. Under the lighter intensities of use, sheep removed a smaller amount of herbage from a larger number of plants, compared with cattle. Therefore, separate regressions are needed for each kind of animal.

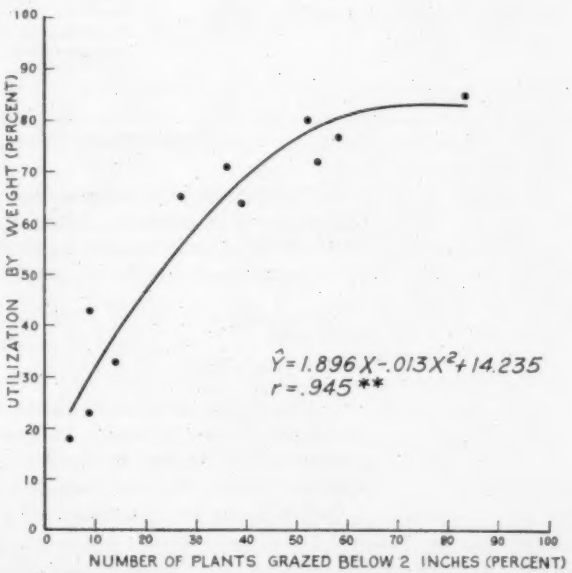


FIG. 3.—Relationship between utilization by weight and the percentage of the number of plants grazed below 2 inches by cattle in the fall season on the Glorieta Mesa pastures.

A limitation of the grazed-plant method is that it fails to detect the higher degrees of utilization of crested wheatgrass. For example, the method did not detect utilization greater than 72 percent under spring grazing by cattle, 76 percent under spring grazing by sheep, or 85 percent under fall grazing by cattle because at these points 100 percent of the plants were grazed. Neither was the method intended to be useful for estimating utilization when fewer than 40 percent of the plants were grazed.

Paced-transects provide satisfactory counts of grazed and ungrazed plants for the grazed-plant method. Using paced-transects, the examiner walks in a straight line from a random point within the area to be sampled, keeping a record of all plants contacted by a point marked on the toe of his shoe. Preliminary results indicate that at least four or five randomly located paced transects, each consisting of 100 plant observations, provided an adequate sample on the experimental pastures. With this number of paced transects, utilization determined from grazed-plant regression equations agreed within 15 percent of those obtained by difference method, and usually much closer.


## Summary

The grazed-plant method for judging utilization of crested wheatgrass was studied at four sites in northern New Mexico during the years 1948 through 1958. The method was tested for sheep and cattle grazed at different intensities during the spring season, and also for cattle grazed at various intensities in the fall.

A comparatively strong relationship was found between the percentage of the number of plants grazed and percentage utilization by weight for spring grazing by cattle and sheep and fall grazing by cattle. Separate regression lines were found to be needed for fall and for spring grazing by cattle. Likewise, different regression lines were found necessary for spring grazing by sheep and cattle. The paced-transect method provided a satisfactory way of obtaining the counts of grazed and ungrazed plants. A general conclusion was that the grazed-plant method is a reasonably reliable, rapid, easy-to-use method for judging utilization of crested wheatgrass in northern New Mexico.


## Literature Cited


1. AHLGREN, H. L. 1947. A comparison of methods used in evaluating the results of pasture research. Jour. Am. Soc. Agron. 39:240-259.
2. CANFIELD, R. H. 1942. A short-cut method for estimating grazing use. U. S. Forest Service Southwestern Forest and Range Expt. Sta. Research Note 99. 5 pp.
3. HEADY, HAROLD F. 1949. Methods of determining utilization of range forage. Jour. Range Mgt. 2:53-63.
4. HOLSCHER, CLARK E., and E. J. WOOLFOLK. 1953. Forage utilization by cattle on northern Great Plains ranges. U. S. Dept. Agric. Circ. 918. 27 pp.
5. HURD, RICHARD M., and N. A. KISSINGER. 1953. Estimating utilization of Idaho fescue (*Festuca idahoensis*) on cattle range by percent of plants grazed. U. S. Forest Service Rocky Mountain Forest and Range Expt. Sta. Paper 12. 5 pp.
6. MATTOX, JAMES E. 1955. A study of percent of plants grazed method of utilization determination and its application. Montana Agric. Expt. Sta. Circ. 88. 140 pp.
7. PARKER, K. W., and G. E. GLENDENING. 1942. A method for estimating grazing use in mixed grass types. U. S. Forest Service Southwestern Forest and Range Expt. Sta. Research Note 105. 5 pp.
8. PECHANEC, J. F. 1936. Comments on the stem-count method of determining the percentage utilization of ranges. Ecology 17:329-331.
9. ———, and G. D. PICKFORD. 1937. A comparison of some methods used in determining percentage utilization of range grasses. Jour. Agric. Res. 54:733-765.
10. ROACH, MACK E. 1950. Estimating perennial grass utilization on semi-desert cattle ranges by percentages of ungrazed plants. Jour. Range Mgt. 3:182-185.
11. SNEDECOR, GEORGE W. 1950. Statistical methods. Iowa State College Press. Fourth Edition. pp. 103-137; 148-155.
12. SPRINGFIELD, H. W., and H. G. REYNOLDS. 1951. Grazing preferences of cattle for certain reseeding grasses. Jour. Range Mgt. 4:83-87.
13. STODDART, L. A. 1935. Range capacity determination. Ecology 16:531-533.



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# Classification of North American Mammals and Birds According to Forest Habitat Preference

Lee E. Yeager

WILD MAMMALS and birds are associated with woods, marsh, prairie, field, or other land or water types, according to their predominant habitat relationships. In North America, and elsewhere, these habitat associations are recognized in both professional and popular circles, and for common usage they are convenient and more or less satisfactory.

Objective classification of mammals and birds according to habitat, however, has been relatively neglected. This circumstance is understandable when the great variability that exists even between closely related species is appreciated. Cottontail rabbits, for example, occur, according to the various forms, in fields, woodlots, high plains, desert scrub, mountain forests, and other environments; and native sparrows occupy every definable vegetative cover type from the arctic to subtropical climes. Wildlife administrators, seeking workable practicality, and taxonomists, dependent on the details of structure as criteria of classification, usually handle — and with good reason—ecological and geographical distribution under such generalized headings as "occurrence," "status," "range," "haunts and habits," or other designation.

Habitat-preference classifications, typically broad in category, are of course in use. Leopold (*16*) designated game species as *farm, forest and range, wilderness,* and *migratory,* an arrangement that is convenient and generally satisfactory for management purposes. Rorimer (*26*) classified birds, with special reference to northern Ohio, according to the environment in which they are most likely to be seen. In similar vein we employ the terms *waterfowl, upland game, tree squirrels, warm-water fish,* and others.

Writers have made much use of designations based on both habits and general habitat preference, examples being *woodlot birds, waders, shorebirds* and *marine mammals.* Classifications based primarily on habits, particularly feeding habits, have resulted in such designations as *predators, flesh-eaters, insectivores, birds of prey, browsers, gnawers,* and *herbivores.* By far the greatest number of writers have preferred to follow taxonomic arrangements, using order, family, or related-group categories (Peterson *21, 22,* Burt and Grossenheider *5,* Pough *23,* Murie *19,* Palmer *20,* Gabrielson and Lincoln, *10,* and many others).

Recently, the writer, in a Society of American Foresters assignment, had occasion to classify (with help acknowledged in Table 1) North American mammals and birds according to their forest-dwelling affinities. The results are revealing, particularly to those who have given only cursory study to these relationships. It is hoped that this paper will serve to extend the understanding of wooded land as an environment of two major classes of North American wildlife.

In delineating habitat preferences as related to woody cover, forest and brushland are used more or less synonymously, first, because the U. S. Forest Service makes no distinction between the two in national forest designation and, second, the extreme overlap in the use of both by many species of mammals and birds makes such differentiation difficult if not impossible. It is recognized, of course, that many other habitat types—aquatic, canyon, rock, sand dunes, meadow, park, etc.—exist, but in a classification concerned only with habitat use of woody cover their inclusion is not considered appropriate or necessary. The ecologist capable of arranging all species of mammals and birds, or all vertebrates or animals, into a habitat classification fully considerate of vegetation, terrain, water, elevation, exposure, latitude, and climatic factors would indeed provide a vast fund of useful knowledge.

In further necessity for brevity, the simplified listing of Palmer (*20*), rather than a more inclusive treatise or check list, was used to indicate mammals by species or specific groups. For birds, the authoritative A.O.U. Check-list (*1*) was employed.

In compiling the listings in Table 1 it became obvious that, despite broad categories, species or groups tolerant of environmental variability must be assigned arbitrarily. In such instances the species or group involved was classified on the basis of what was considered to be the greater habitat preference, or the environment most widely used because of other circumstances. It is conceded that other compilers would almost certainly make assignments at variance to those given here.

The reasons for the preference assigned to a number of species or groups, both mammals and birds, justify brief explanation and identification. Thus, in the bear, weasel, and dog families, there is in each case one species that is exclusively,

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TABLE 1.—CLASSIFICATION OF NORTH AMERICAN MAMMALS AND BIRDS ACCORDING TO FOREST HABITAT PREFERENCE[1]

| Group | No. of species[2] | Primarily forest or brushland | Secondarily forest or brushland | Woody cover not, or only rarely, used |
|---|---|---|---|---|
| | | MAMMALS | | |
| Opposums | 1 | 1 | 0 | 0 |
| Moles | 7 | All moles and probably all shrews may live | | |
| Shrews | 26 | in or adjacent to wood- or brushland | | |
| Bats | 37 | 13 | 4 | 20 |
| Bears | 4 | 2 | 1 | 1 |
| Raccoons | 2 | 2 | 0 | 0 |
| Ring-tailed cats | 1 | 1 | 0 | 0 |
| Weasels | 10 | 4 | 4 | 2 |
| Skunks | 4 | 0 | 4 | 0 |
| Badger | 1 | 0 | 1 | 0 |
| Foxes | 4 | 1 | 2 | 1 |
| Wolves | 3 | 1 | 2 | 0 |
| Cats | 6 | 6 | 0 | 0 |
| Eared seals | 4 | 0 | 0 | 4 |
| Walrus | 1 | 0 | 0 | 1 |
| Hair seals | 9 | 0 | 0 | 9 |
| Marmots | 5 | 0 | 1 | 4 |
| Prairie dogs | 2 | 0 | 0 | 2 |
| Ground squirrels | 21 | 1 | 12 | 8 |
| Chipmunks | 14 | 10 | 4 | 0 |
| Tree squirrels | 9 | 9 | 0 | 0 |
| Flying squirrels | 2 | 2 | 0 | 0 |
| Pocket gophers | 9 | 1 | 4 | 4 |
| Pocket mice and allies | 37 | 7 | 16 | 14 |
| Beavers | 1 | 1 | 0 | 0 |
| Nutria | 1 | 0 | 0 | 1 |
| Grasshopper mice | 2 | 0 | 2 | 0 |
| Harvest mice | 5 | 0 | 1 | 4 |
| Pigmy mouse | 1 | 0 | 0 | 1 |
| White-footed mice | 14 | 8 | 4 | 2 |
| Rice rats | 2 | 0 | 0 | 2 |
| Cotton rats | 3 | 0 | 0 | 3 |
| Woodrats | 7 | 4 | 3 | 0 |
| Lemming mice | 6 | 0 | 2 | 4 |
| Spruce mice | 3 | 2 | 1 | 0 |
| Red-backed mice | 4 | 2 | 1 | 1 |
| Meadow mice | 18 | 0 | 4 | 14 |
| Sagebrush mouse | 1 | 0 | 1 | 0 |
| Pine mouse | 1 | 1 | 0 | 0 |
| Water rat | 1 | 0 | 0 | 1 |
| Muskrat | 1 | 0 | 0 | 1 |
| Mountain beaver | 1 | 1 | 0 | 0 |
| Jumping mice | 3 | 1 | 2 | 0 |
| Porcupines | 1 | 1 | 0 | 0 |
| Pikas | 1 | 0 | 0 | 1 |
| Cottontails | 8 | 5 | 3 | 0 |
| Hares | 3 | 1 | 0 | 2 |
| Jackrabbits | 5 | 0 | 0 | 5 |
| Peccaries | 1 | 1 | 0 | 0 |
| Wild boar | 1 | 1 | 0 | 0 |
| Deer | 7 | 2 | 3 | 2 |
| Pronghorn | 1 | 0 | 0 | 1 |
| Bison, sheep, and goats | 5 | 0 | 4 | 1 |
| Armadillos | 1 | 1 | 0 | 0 |
| Manatees | 1 | 0 | 0 | 1 |
| Whales and allies | 40 | 0 | 0 | 40 |
| Totals | 369 | 93 | 86 | 157 |
| | | BIRDS | | |
| Loons and grebes | 10 | 0 | 7 | 3 |
| Albatrosses, petrels, etc. | 35 | 0 | 0 | 35 |
| Pelicans, cormorants, etc. | 18 | 0 | 8 | 10 |
| Herons, long-legged waders | 23 | 0 | 19 | 4 |
| Waterfowl | 60 | 5 | 10 | 45 |
| Vultures, hawks, falcons | 36 | 11 | 22 | 3 |
| Gallinaceous birds | 21 | 6 | 9 | 6 |
| Cranes, rails, coots | 14 | 0 | 1 | 13 |
| Shorebirds | 57 | 1 | 1 | 55 |
| Gulls, terns | 41 | 0 | 6 | 35 |
| Auks, murres, puffins | 20 | 0 | 1 | 19 |
| Pigeons, doves | 12 | 7 | 4 | 1 |
| Parrots | 1 | 1 | 0 | 0 |
| Cuckoos, roadrunners | 6 | 3 | 3 | 0 |
| Owls | 18 | 13 | 2 | 3 |
| Goatsuckers | 6 | 0 | 4 | 2 |
| Swifts, hummingbirds, trogons | 20 | 9 | 9 | 2 |
| Kingfishers | 2 | 0 | 0 | 2 |
| Woodpeckers | 22 | 18 | 4 | 0 |
| Flycatchers | 31 | 17 | 8 | 6 |
| True larks | 2 | 0 | 0 | 2 |
| Swallows | 9 | 0 | 4 | 5 |
| Jays, magpies, crows | 15 | 6 | 7 | 2 |
| Chickadees, titmice | 14 | 11 | 3 | 0 |
| Nuthatches, creepers | 5 | 5 | 0 | 0 |
| Wrentits, wrens, dippers | 12 | 2 | 4 | 6 |
| Mimic thrushes | 10 | 0 | 5 | 5 |
| Thrushes, solitaires, bluebirds | 11 | 6 | 4 | 1 |
| Gnatcatchers, kinglets | 4 | 2 | 1 | 1 |
| Wagtails, pipits | 3 | 0 | 0 | 3 |
| Waxwings, silky flycatchers | 3 | 2 | 1 | 0 |
| Shrikes, starlings | 4 | 0 | 4 | 0 |
| Vireos | 11 | 8 | 3 | 0 |
| Wood warblers | 54 | 36 | 16 | 2 |
| Weaver finches, orioles, blackbirds | 22 | 5 | 10 | 7 |
| Tanagers | 4 | 4 | 0 | 0 |
| Finches and native sparrows | 78 | 17 | 21 | 40 |
| Totals | 714 | 195 | 201 | 318 |

[1]Aquatic mammals living primarily in forested area considered as forest or brushland habitat preference. Domestic mammals and birds excluded from tabulation.

[2]Mammals arranged according to Palmer (*20*); birds according to AOU Check-list (*1*). Bats compiled by Dr. Terry Vaughan and birds by Dr. Ronald A. Ryder, Colorado State University.

or almost exclusively, nonforest in its habitat relationship. They are, respectively, the polar bear, the sea otter, and the arctic fox. This fox, at times, may use willow or boreal forest cover, but it is essentially an inhabitant of the tundra, arctic beaches, and sea ice (Preble *24*, Anderson *2*, Bee and Hall *4*).

The weasel most arbitrarily classified is the black-footed ferret, listed as nonforest as to habitat choice. It has been recorded in prairie-dog colonies bordered or interspersed by brushland, and once in similar proximity to the brush and forest type prevalent at about 9,200 feet in Colorado (Warren, *28*). It is, however, a grassland species, apparently independent of woody cover in its habitat requirements (Cockrum, *6*, Hall and Kelson, *13*).

Also defying clear-cut designations as to habitat preference are the rabbits, hares, and pikas. Cottontails, for example, occur in one form or another in virtually every niche of their countrywide range (Hall *11*). All forms, however, show greater or less preference for brush, and some species are common in extensive forests, among them the mountain cottontail, found at elevations of 5,000 to 11,000 feet (Warren *28*, Hall *12*, Durrant *7*, Yeager and Riordan *29*). The designation of all forms as having primary or secondary preference for woody cover seems, therefore, justified. Snowshoe rabbits likewise occur from the Lake States northward, with southern extensions in the Appalachian, Rocky, and Sierra Mountains, in virtually every patch of coniferous or mixed conifer-hardwood timber in this vast range.

The two species of arctic hares generally recognized are essentially nonforest in habitat preference, both showing a tendency to avoid even scrub willow (Palmer *20*). In jackrabbits, habitat tolerance in the several species extends from open fields and grassland plain to alpine meadows above 12,000 feet. All species, however, are primarily inhabitants of open country, their association with brushland and occasionally forests being circumstantial. They are classified here, with some arbitrariness, as nonforest in habitat preference. Pikas typically occur in rock slides at high elevations in the West, but they may frequent grass-interspersed willows and rarely climb trees (Howell *15*) during foraging activities.

Among wild hoofed mammals, the Bovidae are primarily inhabitants of nonforested range. Thus, the bison characteristically occurred on the high plains; the muskox occurs on the Arctic slopes, and both the mountain sheep and mountain goat are found in mountain areas, largely above timberline. The wood buffalo, recognized as a distinct subspecies, is established in wooded as well as open country in Wood Buffalo Park, northeastern Alberta. Plains buffalo were introduced into this area from 1925 to 1928, resulting in extensive hybridization (Fuller *9*), all intergrades adapted to forest-park conditions. The muskox is a grazer in summer and a browser, mainly on arctic willow and birch, in winter (Preble *24*, MacFarlane *18*). Mountain sheep readily winter on timbered south slopes, usualy near mountainous escape terrain. Goats may descend to tidewater in Alaska and British Columbia, and the successful plant in the Black Hills about 1924 indicates adaption to forested environments.

Of the Cervidae, elk, mule deer, and barren-ground caribou, were originally plains or open-forest in habitat preference. Elk and mule deer have become largely forest-dwelling through most of the West, but both show noticeable preference for forest openings, or parks, where grass or browse is generally more abundant. Barren-ground caribou spend the warmer seasons north of the open coniferous forests at tree line (Preble *25*, Seton *27*, Banfield *3*). Woodland caribou, more southern in distribution, go above timberline on the mountainous parts of their range only in summer.

Antelope are inherently native to the high plains and are associated with sagebrush, soapweed (bayonet-leaf), and other western plants. Recent studies have showed that antelope feed mainly on plains browse, forbs, and grass (Einarsen *8*, Hoover, Till, Ogilvie *14*).

Opossums, raccoons, the cats, and the tree squirrels are forest dwellers, although all except certain squirrels may den on or in the ground or in rock cavities. Beavers and river otters occur about brush- or forest-bordered waters and in forested swamps. In addition, the otter is adaptable to water habitats such as the Everglades or parts of the Intercoastal Canal. Moles, shrews, bats, and the many groups of rodents (other than those just mentioned) show endless variability in habitat, but approximately 150 out of the 235 forms indicated may be associated with woody cover of one sort or another.

Among birds, the many groups that show preference for forest environment include all or nearly all of the owls, pigeons, cuckoos, swifts, hummingbirds, trogons, woodpeckers, flycatchers, jays, crows, chickadees, titmice, nuthatches, creepers, thrushes, vireos, wood warblers, orioles, and tanagers. Hawks and vultures are predominantly open-country types, but most use forest and brushland areas for nesting and foraging. Notable exceptions are the marsh hawk and the snowy and short-eared owls.

Bird groups having wide variation in habitat preference include the waterfowl, galliforms, flycatchers, blackbirds, finches, and sparrows, the last showing almost unlimited versatility in environmental adaptability. It is noteworthy that game species are prominent among birds having wide differences in their choice of range, such groups including waterfowl, grouse, quails, and doves. Except for waterfowl and various doves, most are forest or brushland species. Forest-inhabiting ducks include the wood duck, hooded merganser, buffle-head, common goldeneye, and Barrow's goldeneye, all dependent primarily on tree cavities for nesting purposes. In addition, 10 or more species are associated with forest environments (swamps, wooded streams, flooded bottomlands, etc.) during given seasons or circumstances.

Among the important gallinaceous group, species wholly or primarily of forest-dwelling habit in-

clude the chachalaca, the ruffed, blue, and spruce grouse, the wild turkey, and the mountain quail. Most other representatives of the group are more or less associated with brushland. Farthest removed from dependence on woody cover are the several forms of the prairie chicken and the introduced gray (Hungarian) partridge.

The group of game birds represented by doves and pigeons is, except for the mourning dove and several forms of the ground dove (Leopold *17*), forest or brushland inhabitants. Wholly dependent on forests are such important species as the band-tailed, white-winged, and red-billed pigeons. The mourning dove—the most widely distributed game bird in the United States—everywhere prefers open tree growth for nesting but on the Great Plains, where tree cover is lacking, it commonly nests on the ground.

Of the 714 species of birds recognized by the American Ornithologists' Union as occurring regularly in North America (north of Mexico), 195 are primarily forest- and brushland-living and 201 show a secondary preference for forest and brushland types. Slightly more than 55 percent of all species of North American birds are thus included. Of the 300-odd remaining forms, roughly two-thirds are essentially aquatic in habitat preference, of which about 160 characteristically occur on various freshwater environments and about 65 on coastlines or islands at sea.

## Literature Cited


1. AMERICAN ORNITHOLOGISTS' UNION. 1957. Check-list of North American birds. 5th ed. Lancaster, Pa. 691 pp.
2. ANDERSON, R. M. 1947. Catalog of Canadian recent mammals. Bul. Nat. Mus. Canada 120:v+238 pp.
3. BANFIELD, A. W. F. 1954. Preliminary investigation of the barren-ground caribou. Part I. Former and present distribution, migrations, and status. Can. Dept. North. Affairs and Nat'l. Resources, Can. Wildl. Service, Wildl. Mgt. Bul. Series I, No. 10A, 79 pp.; Part II, No. 10B, 112 pp. (litho.).
4. BEE, JAMES W., and E. RAYMOND HALL. 1953. Mammals of northern Alaska on the Arctic Slope. Univ. Kan., Mus. Nat. Hist. Misc. Publ. 8:1-309.
5. BURT, W. H., and R. P. GROSSENHEIDER. 1952. A field guide to the mammals. Houghton Mifflin Co., Boston, Mass. 200 pp.
6. COCKRUM, E. LENDELL. 1952. Mammals of Kansas. Univ. Kan., Mus. Natl. Hist. 7(1):1-303.
7. DURRANT, STEPHEN D. 1952. Mammals of Utah. Univ. Kan., Mus. Nat. Hist. 6:1-549.
8. EINARSEN, ARTHUR S. 1948. The pronghorn antelope and its management. Wildl. Mgt. Inst., Washington, D. C. 228 pp.
9. FULLER, W. A. 1960. Behavior and social organization of the wild bison of Wood Buffalo Park, Canada. Arctic 13(1):3-19.
10. GABRIELSON, IRA N., and FREDERIC C. LINCOLN. 1959. Birds of Alaska. Stackpole Co., Harrisburg, Pa. 929 pp.
11. HALL, E. RAYMOND. 1951. A synopsis of the North American lagomorpha. Univ. Kan., Mus. Nat. Hist. 5(10):119-202.
12. ———. 1946. Mammals of Nevada. Univ. Calif. Press, Berkeley, 710 pp.
13. ———, and KEITH R. KELSON. 1959. The mammals of North America. Ronald Press Co., New York. 2 vols., 1-546 + 79; 547-1083 + 79 pp.
14. HOOVER, ROBERT L., C. E. TILL, and STANLEY OGILVIE. 1959. The antelope of Colorado. Colo. Game and Fish Dept., Tech. Bul. No. 4. 110 pp.
15. HOWELL, ARTHUR H. 1924. Revision of the American pikas. N. A. Fauna 47:1-57.
16. LEOPOLD, ALDO. 1933. Game management. Chas. Scribner's Sons, New York. 481 pp.
17. LEOPOLD, A. STARKER. 1959. Wildlife of Mexico. Univ. Calif. Press, Berkeley. 568 pp.
18. MACFARLANE, RODERICK. 1905. Notes on mammals collected and observed in the northern Mackenzie River district, U. S. Natl. Mus. Proc. 28: 673-764.
19. MURIE, OLAUS. 1954. A field guide to animal tracks. Houghton Mifflin Co., Boston, Mass. 374 pp.
20. PALMER, RALPH S. 1954. The mammal guide. Doubleday and Co., Inc., Garden City, N. Y. 384 pp.
21. PETERSON, ROGER T. 1939. A field guide to the birds. Houghton Mifflin Co., Boston, Mass. 290 pp.
22. ———, 1941. A field guide to western birds. Houghton Mifflin Co., Boston, Mass. 240 pp.
23. POUGH, RICHARD H. 1953. Audubon guides . . . birds of eastern and central North America. Doubleday and Co., Inc., Garden City, N. Y. 352 pp.
24. PREBLE, E. A. 1902. A biological investigation of the Hudson Bay region. N. A. Fauna No. 22:1-140.
25. ———. 1908. A biological investigation of the Athalaska-Mackenzie region. N. A. Fauna No. 27:1-574.
26. RORIMER, IRENE T. 1940. A field key to our common birds. Cleveland Mus. Nat. Hist., Pocket Nat. Hist. 8. 158 pp.
27. SETON, E. T. 1929. Lives of game animals. 4 vols. Doubleday and Co., Inc., Garden City, N. Y.
28. WARREN, EDWARD R. 1942. The mammals of Colorado. Univ. Okla. Press, Norman. 330 pp.
29. YEAGER, LEE E., AND LAURENCE E. RIORDAN. 1953. Effects of beetle-killed timber on range and wildlife in Colorado. Trans. N. A. Wildl. Conf. 18:596-616.


## The Finances of Smokey Bear

The evolution of Smokey Bear as the symbol of fire protection is well known to foresters. So also is the fact that a real live bear by that name resides in the National Zoological Park in Washington, D. C., having been rescued from a New Mexico forest fire as a cub in 1950. He has entertained millions of children and adult visitors in the past decade.

Smokey quickly captured the imagination of the country, and private and business groups began to use his likeness in ways unrelated to fire prevention. To assure that Smokey's likeness would continue to be used in a suitable manner, U. S. Congressman Harold C. Ostertag of New York, who has been active in forestry affairs in his own state, introduced legislation establishing necessary safeguards and providing for an orderly commercial education support program. The legislation was unanimously adopted and signed into law.

The Smokey Bear Act provided that a special committee will pass on all requests for using the Smokey Bear symbol and royalties will be paid for any commercial use of the symbol. Over the past eight years the Smokey Bear program has brought in more than $200,000 in royalties and these funds are used to help support the nationwide Cooperative Forest Fire Prevention Campaign of the U. S. Forest Service, state foresters, and the Advertising Council.

More than 3½ million young Americans have enlisted in the Junior Forest Ranger program and Smokey still receives about 1,000 letters each day at Forest Service headquarters in Washington. His young admirers have contributed more than $2,500 in pennies, nickels, and dimes over the years so that the live Smokey might be housed in a special ranger-station home with his uniform and equipment on display. The sum is far short of that needed. Presently, he lives like any other bear at the Zoo and the question most frequently asked of Zoo attendants is "Where is Smokey's uniform?"

Congressman Ostertag reports that there now appears a possibility of securing proper quarters for Smokey, as a major improvement program is about to start at the Zoo.

# Notes & Observations

## Pruning and Epicormic Branching in Red Alder[1]

Defect in red alder (*Alnus rubra*) is of special concern because sawlogs of this species are mainly used for manufacture of furniture and paneling. Knots are the most common defect, and their frequency and distribution largely determine lumber grade. To determine how pruning affects the formation of clear wood and an improvement in lumber grade, sections were taken from a 43-year-old stand of red alder that had been pruned at age 21. Observations based on the examination of these sections are summarized in this report.

Exposure of knots through sectioning showed that pruning was effective in eliminating radial extension of dead branch stubs into the outer sapwood (Fig. 1). In some cases, stubs of pruned limbs were grown over within 2 years. Pruning, however, did not prevent incidence of decay in branch stubs; decay was found in every dead or pruned stub. This does not seem serious, however, because the decay rarely extended beyond extremities of knots, and did not hinder the increment of clear wood. Furthermore, all knots, whether sound or unsound, are recognized as defects in the principal products from red alder lumber.[2]

Although clear wood started forming shortly after pruning, gains in wood quality were frequently offset by the development of epicormic branches (Fig. 2). These branches occurred singly or in clusters, causing defects in the form of knots and blemishes. The epicormic branches usually originated where other branches had been naturally or artificially pruned.

Epicormic branches in red alder develop from dormant bud strands (bud-producing tissue), which also cause minor defects. These bud strands—usually ⅛ to ¼ inch in diameter—were traceable radially toward the pith (Fig. 3). The bud strand is believed to originate in the leaf axil along with the primary bud that gave rise to the original live limb. The horizontal elongation of bud strands clearly distinguishes them from the upward-sloping knots of small branches.

The physiological development of epicormic branches in red alder has not been thoroughly studied. This phenomenon, however, is probably similar to that in other angiosperms, which has been explained by reduced activity of growth inhibitors. In eucalyptus, for example, the bud strands are capable of producing leafy shoots, but their development is normally held in check by the inhibiting effects of

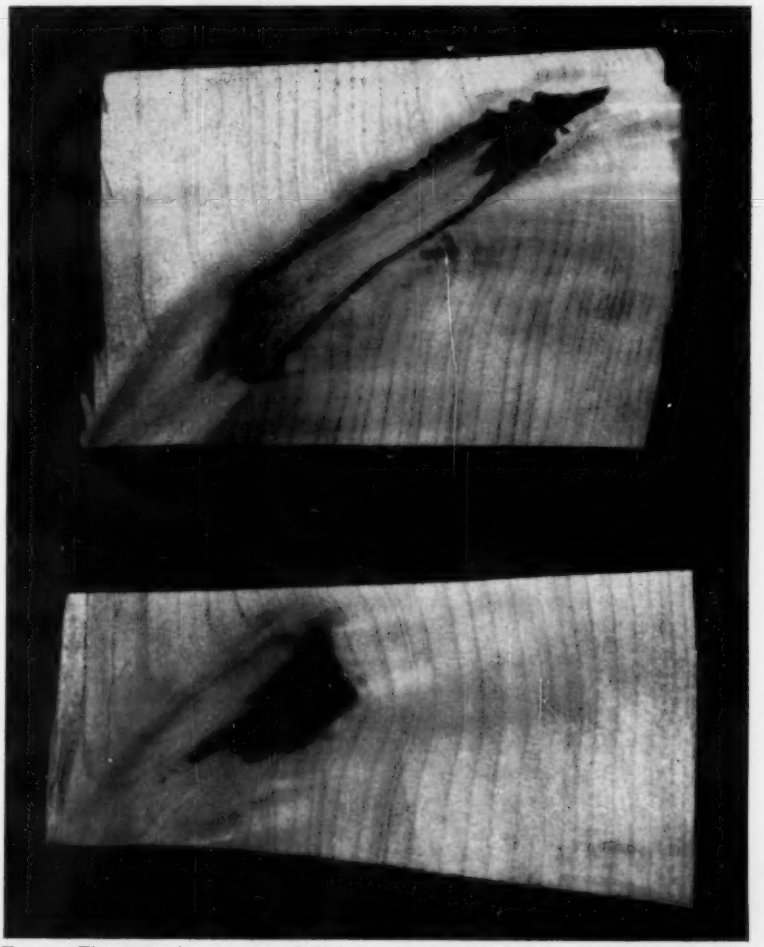

FIG. 1.—The stub of an unpruned limb (top) extended far into wood formed after death of the limb. Clear wood formed over the stub of a pruned limb (bottom) within 2 years.

[1]Based on results of a study at the Corvallis Research Center, U. S. Forest Service, maintained in cooperation with the School of Forestry, Oregon State University

[2]Pfeiffer, J. R., and A. C. Wollin. Red alder log and lumber grading. Oreg. Forest Prod. Lab. Report G-3. 21 pp. Illus. 1954.

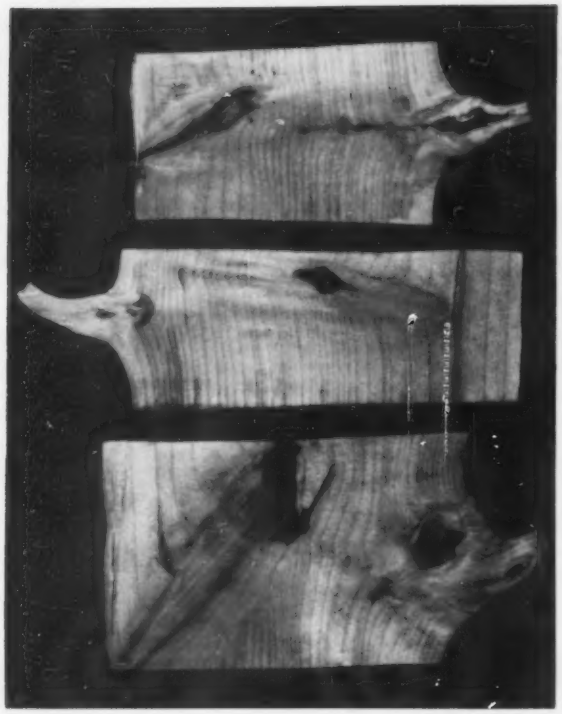

FIG. 2.—Clear wood was frequently disfigured by development of epicormic branches.

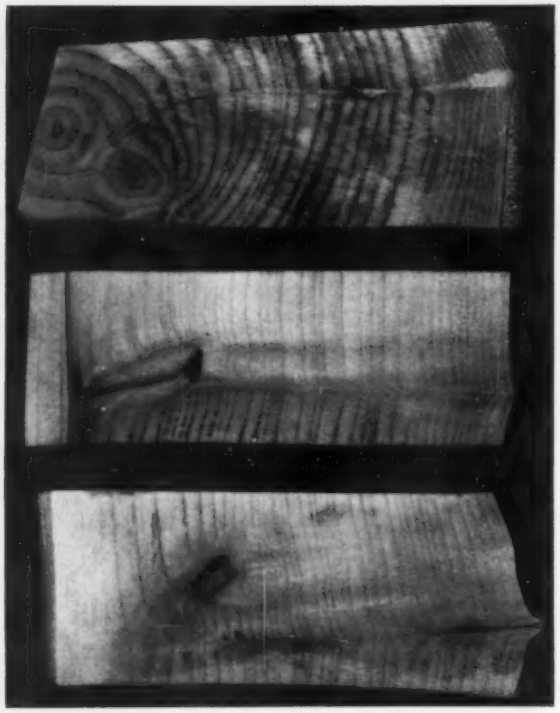

FIG. 3.—Bud strands grew radially outward from the vicinity of old leaf axils. Epicormic branches arise from bud strands following some physiological stimulus.

substances produced in leaves or buds of nearby branches.[3] When a limb is pruned, this growth-restraining substance is removed and one or several shoots may develop from the bud-producing tissue.

Exposure to light may also cause epicormic branch development in red alder. In eucalyptus[4] and other plants,[5] inhibiting substances move laterally away from light and tend to concentrate on shaded sides of stems. In effect, this releases dormant buds on sides of stems exposed to light and stimulates branch development.

Apparently, pruning cannot be expected to substantially improve the quality of red alder lumber unless epicormic branching can be controlled. Until more is learned of the cause and control of epicormic branching, the desirability of pruning red alder remains questionable.

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## Variable Response of Diffuse- and Ring-Porous Species to Girdling

The effectiveness of girdling for killing weed trees in north Georgia was found to vary appreciably for the following hardwood species: white oak, post oak, chestnut oak, scarlet oak, black oak, hickories, black gum, red maple, and sourwood. All trees except black gums were ringed once at a convenient height, approximately 3½ feet above the ground. Two girdles 2 inches apart at 3½ feet were applied to black gum. Except for hickories, the Little Beaver Tree Girdler was employed, making bands about 1 inch wide and up to 1¾ inches deep. Axes were used on hickories due to their tough bark and to reduce machine maintenance. Girdles completely encircled trees and there was no callusing-over. The average d.b.h. of trees for all species ranged from 6 to 9 inches.

Whether trees are ring-porous or diffuse-porous seems to be the principal criterion on which girdling effectiveness may be predicted, according to data from this study. Only 7 percent of the ring-porous trees displayed living crowns, while 70 percent of the diffuse-porous species had green foliage 2 and 3 years after treatment (Table 1). Although in many instances the surviving crowns were thin and unhealthy in appearance, the fact that the photosynthetic organs were functioning indicates continued upward translocation of water through the xylem. It has been pointed out that at least some ring-porous species conduct water only in the outer few annual rings, and are therefore more susceptible to mechanical injury than diffuse-porous species which utilize deeper layers of xylem tissue.[1] Huber[2]

[3]Jacobs, M. R. Growth habits of the eucalypts. Australia Forestry and Timber Bur., Canberra. 262 pp. Illus. 1955.

[4]See footnote 3.

[5]Leopold, Carl A. Auxins and plant growth. University of California Press, Berkeley and Los Angeles. 354 pp. Illus. 1955.

[1]Kramer, P. J., and T. T. Kozlowski. Physiology of trees. McGraw-Hill Book Co., New York. 1960.

TABLE 1.—EFFECT OF GIRDLING ON DIFFUSE- AND RING-POROUS SPECIES 2 AND 3 YEARS AFTER TREATMENT[1]

| Species | Number of trees observed | | Percent sprouting | | Percent with living crowns |
|---|---|---|---|---|---|
| Ring-porous | | | | | |
| Hickories (*Carya* spp.) | 49 | | 43 | | 12 |
| White oak (*Quercus alba* L.) | 141 | | 45 | | 11 |
| Post oak (*Q. stellata* Wangenh.) | 21 | | 43 | | 5 |
| Chestnut oak (*Q. prinus* L.) | 37 | | 65 | | 8 |
| Scarlet oak (*Q. coccinea* Muench.) | 147 | | 59 | | 3 |
| Black oak (*Q. velutina* Lam.) | 53 | | 30 | | 2 |
| Total | 448 | Avg. | 49 | Avg. | 7 |
| Diffuse-porous | | | | | |
| Black gum (*Nyssa sylvatica* Marsh.) | 128 | | 88 | | 84 |
| Red maple (*Acer rubrum* L.) | 54 | | 93 | | 74 |
| Sourwood (*Oxydendrum arboreum* [L.]DC.) | 153 | | 99 | | 58 |
| Total | 335 | Avg. | 94 | Avg. | 70 |

[1]Analysis of the data revealed no important differences between 2-year-old and 3-year-old treatments and therefore data were combined.

notes that the speed of water-translocation in ring-porous trees is ten times as rapid as in diffuse-porous; but for the former, movement occurs over a narrow zone. Bull and Chapman[3] found that red and black gums are relatively difficult to kill by girdling, sometimes surviving for 5 years, while oaks succumbed quickly. Their results, and ours, may be explained by the fact that girdling usually severed the conducting xylem layers of ring-porous trees but failed to penetrate deeply enough to do the same to diffuse-porous species. However, this strong division between ring- and diffuse-porous woods is not evident in other studies, perhaps because girdles made with axes are frequently deep enough to sever the functioning xylem rings in both groups.

No explanation is offered for the differences in sprouting between the two groups of species. About three-quarters of those sprouting had more than 4 sprouts per tree, mostly at the root collar. The notable exception is black gum, for which stump sprouting predominated.

Root grafting among the diffuse-porous trees of this experiment is extremely unlikely due to the wide dispersion of the hardwoods. As no callusing-over was evident, all girdled stems are expected to eventually die. However, if rapid release from overstory competition is desired, girdling alone may not suffice for the diffuse-porous species.

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[2]Huber, B. Die physiologische Bedeutung der Ring- und Zerstreutporigkeit. Ber Deut. Bot. Gas. 53:711-719. 1935.

[3]Bull, H., and R. A. Chapman. Killing undesirable hardwoods in southern forests. U. S. Forest Service, Southern Forest Expt. Sta. Occ. Paper 50. 1935.

## A Log and Tree Grade Syllabus

Over the years there has been an increasing general interest in better methods of timber quality evaluation. Important tools for making evaluations adequately and efficiently are log and tree grades. In the Central States this interest led to a Symposium on Hardwood Saw Log Grading, held in June 1957, under the auspices of the Central States Section, SAF. The Symposium, the proceedings of which were published by Purdue University and the Illinois Agricultural Experiment Station, confined the importance of the field and sent to the Society Council the suggestion that, since symposia, and less formal discussion groups were useful devices for isolating needs for and expanding efforts to develop tools for timber quality evaluation, the Society should stimulate similar activities on a broad front under a coordinated approach. It recommended that a Log and Tree Grade Committee be appointed to do this job. After thorough consideration of the matter, the Council, in 1959, authorized the appointment of such a Committee within the Division of Forest Products. The following were chosen to be members of the Committee:

V. W. Cothren, Southern Pine Association, New Orleans, La.

Woodrow W. King, Forestry Investigations, TVA, Norris, Tenn.

Elbert C. Cleaveland, Boise Cascade Corp., Boise, Idaho.

Thomas Orr, Weyerhaeuser Co., Klamath Falls, Ore.

Edward Zaidlicz, Bureau of Land Management, Portland, Ore.

Henry Wershing, Indian Service, Department of the Interior, Washington, D. C.

George Stenzel, College of Forestry, University of Washington, Seattle, Wash.

Oliver P. Wallace, Department of Forestry, University of New Hampshire, Durham, N. H.

John Putnam, U. S. Forest Service, Stoneville, Miss.

Robert Kolbe, Conner's Lumber & Land Co., Laona, Wis.

C. R. Lockard, U. S. Forest Service, Washington, D. C. (*chairman*)

### Actions

The Committee has met twice at annual meetings and has considered the type of actions the Society might take in this field. At the outset, it appeared there were two: one was the preparation of a special terminology; this is now being compiled under the direction of Henry Wershing. The other was the preparation of a discussion syllabus.

It is known that timber quality in general, and log and tree grading in particular, is not covered as universally and as thoroughly as it should be in view of its importance in college curricula. Therefore, graduates may not be, and generally are not as well oriented in this field as they are in other basic fields of forestry operations. Consequently, the Committee believes that special effort should be made to obtain a place on the agenda of National, Section, and Chapter programs for discussions of all aspects of the timber quality field, not only because of the importance of the field in itself, but because it im-

pinges on so many others. Thus, discussion items important to timber quality might actually be handled by experts in other, but related, fields. In order to keep the discussions in proper context and also in order to stimulate discussions, a syllabus containing a list of subjects will be useful. It will help the program chairman who wishes to set up panel discussions or otherwise build up a meeting program. The Committee members have agreed to help any program chairman secure competent participants in programs in this field. To be useful a syllabus need not be complete and it should be realized that it may include subjects not normally considered within the field. With these considerations in mind, therefore, the Committee presents the following suggested subject matter or program topic list as an aid to SAF chairmen or others interested in formulating lively programs.

### Topics Common to Log and Tree Grading

Use classes versus grades.

Defects and their evaluation in terms of product grades, total tree value or total log value.

Relation of grades to volume determination.

Importance of and methods of handling hidden defects, both scalable and nonscalable.

Training problems—methods and material.

Basic differences between grading or classing logs in trees, and in dealing with cut logs.

Methods of developing and limitations on the use of performance tables.

Statistical methods applicable in grade or class analysis.

Standard procedures for collecting and analyzing quality data.

The importance of utilization standards in grading and classing.

Relation of diameter and length to quality.

The necessity for a standard floor in grading and classing.

Product type or market value as the basis for evaluation studies.

Product prices; their sources and limitations.

Price relations and the effect of their stability on grade development and use.

Quality or value indices and their usefulness in log and tree grading.

Effect of sale practices (whether wholesale or retail) and their effect on log and tree grade development.

The relation of scale-lowering defects to grading.

The possibility of systems, with several degrees of reliability, for various uses such as research, purchasing, and forest survey.

Possibilities of universal systems for species or groups of species.

Intraspecies variation in attributes and effect on grading systems.

Relation of size or other growth-controlling factors to grade specifications or grade performance.

### Mill Studies

Techniques commonly used in mill scale studies.

Guides for standardizing and evaluating sawmill, veneer mill, and other converting plant performance.

Should product yields be based on average commercial or controlled grade sawing practices in log and tree grade developments?

Where does overrun come from?

### Statistical

Possibility of and progress toward standard statistical procedures for establishing size of sample in grade studies.

Statistical procedures useful in analyzing timber quality.

Desirability and availability of standard EDP (Electronic Data Processing) programs in the quality field.

The desirability of establishing prescribed limits of error for population parameters in this field.

In lumber mill studies, methods of determining sampling intensity for converting green lumber yields to dry lumber yields.

### General

A good basic definition of timber quality.

Standards applicable to grade development and performance.

Problems of relating pricing of products to study point (green lumber versus dry lumber, for example).

How to reconcile volume and quality survey errors.

Possibility and usefulness of multiple product grading systems.

Information on and discussions of grading systems now in use.

Concepts of universal quality determinants such as clear wood percent, soundness of stem and components, branch size factors, tree or log size.

Suitability of present product grading systems as a basis for timber quality evaluation.

The foregoing topics are not necessarily listed in order of importance and no idea of priority is included in the arrangement. In fact, within a broad heading there may be no direct or implied relationship between one subject and another.

From the number and variety of the items listed above, the importance and scope of the field of timber quality evaluation can readily be observed. Actually, this syllabus only scratches the surface. The Committee will welcome correspondence concerning the appropriateness of any of these subjects or discussions about them. It certainly hopes that many of these will be discussed under the headings suggested or under a more appropriate heading at many Society meetings in the near future. The Committee should like to receive additional subjects for supplementary listing.

C. R. LOCKARD,
*Chairman, Log and Tree Grade Committee, Division of Forest Products, SAF*

## Relation of Plot Size to Variability: An Approximation

Knowledge of the variability among sampling units is essential in designing an efficient sample survey. The information can sometimes be obtained from previous surveys of the same or similar populations. When this is done, the effect of plot size on variability must be considered. This note provides a method of using the variability observed for one size of plot to approximate the variability of some other plot size.

The exact relationship cannot be generalized; it depends on the nature of the population itself. The only sure way of knowing how variability changes with plot size is to make a special study of the population in question. If that does not seem warranted, an approximation that has been found useful in many southern forest populations is to assume that the squared coefficient of variation $(CV)^2$ is inversely proportional to the square root of the relative plot size $(P)$. Thus, if the coefficient of variation $(CV_1)$ for plots of size $P_1$ is known, the estimated coefficient $(CV_2)$ for plots of the same shape and orientation but different size $(P_2)$ would be:

$$(CV_2)^2=(CV_1)^2\sqrt{\frac{P_1}{P_2}}$$

As an example, suppose that in a survey of the volume of a young loblolly pine plantation the coefficient of variation for one-fifth acre circular plots was found to be 30 percent. The estimated coefficient of variation that might be obtained from one-tenth acre circular plots in a similar population is:

$$(CV)^2=(30)^2\sqrt{\frac{.2}{.1}}$$
$$=900\ (1.414)$$
$$=1272.6$$

or, $CV = 36$ percent

Application of the approximation to some published data provides an indication of its usefulness. Mesavage and Grosenbaugh[1] reported coefficients of variation for plots of various sizes in upland areas of the mid-South. From their values for 0.2-acre plots approximations were made of the coefficients that might be obtained with plots of 0.1, 0.4, or 0.8 acre. These are shown in Table 1, together with the variability actually observed. Table 2 shows variability for five plot sizes observed in old-growth Douglas-fir by Johnson and Hixon.[2] The observed coefficient for the 0.1-acre plot was used to predict the coefficients for the four other plot sizes.

Most of the predictions are reasonably close to the observed values, but a few indicate that use of the approximation is not without some hazards. Clumpy populations, as might be encountered when sampling minor components of a stand, are particularly troublesome. The relationship of plot size to variability is strongly influenced by the size of the clumps and the amount of open space between them. In general, plots large enough so that they almost always include some clump and some hole will show less variation than is indicated by predictions made from smaller plots that commonly fall entirely within a clump or a hole. But considerable experience and skill are needed to define "larger" and "smaller" and make the appropriate adjustments.

It should be noted that drastic changes in plot shape or orientation may affect variability even if there is no change in plot size. Variation is usually smaller among plots that are long and narrow than among those that are square or circular. And variation among rectangular plots will ordinarily be greater when their long axis is parallel to the contour than when it is at right angles. The approximating procedure reflects only the effect of plot size. It should not be used if plot shape or orientation will be greatly changed unless there is good reason to believe that these changes are unlikely to affect variability.

TABLE 1.—OBSERVED AND PREDICTED COEFFICIENTS OF VARIATION IN BOARD-FOOT VOLUME FOR SOME TIMBER TRACTS IN NORTHERN ARKANSAS AND NORTHERN LOUISIANA (FROM MESAVAGE AND GROSENBAUGH)

| Species sampled | 0.2-acre plots | 0.1-acre plots | | 0.4-acre plots | | 0.8-acre plots | |
|---|---|---|---|---|---|---|---|
| | Observed | Predicted | Observed | Predicted | Observed | Predicted | Observed |
| | *Percent* | | | | | | |
| All | 147.1 | 175 | 168 | 124 | 126 | 104 | 108 |
| Cedar only | 108.6 | 129 | 137 | 91 | 94 | 77 | 74 |
| All | 101.8 | 121 | 120 | 86 | 85 | 72 | 70 |
| All | 92.7 | 110 | 113 | 78 | 81 | 66 | 73 |
| All | 102.8 | 122 | 116 | 86 | 91 | 73 | 86 |
| White oak only | 141.9 | 169 | 197 | 119 | 117 | 100 | 78 |
| All | 91.7 | 109 | 103 | 77 | 84 | 65 | 76 |
| All | 55.4 | 66 | 73 | 47 | 45 | 39 | 35 |
| Pine only | 99.8 | 119 | 119 | 84 | 82 | 71 | 66 |
| White oak and yellow-poplar | 131.5 | 156 | 179 | 111 | 86 | 93 | 66 |
| Gum & hickory | 129.2 | 154 | 163 | 109 | 93 | 91 | 63 |

TABLE 2.—COEFFICIENTS OF VARIATION OF VOLUME FOR OLD-GROWTH DOUGLAS-FIR (FROM JOHNSON AND HIXON)

| Plot size (acres) | Predicted | Observed |
|---|---|---|
| | *Percent* | |
| 0.05 | 89 | 96 |
| .1 | — | 75 |
| .2 | 63 | 58 |
| .3 | 57 | 50 |
| .4 | 53 | 49 |

[1] Mesavage, Clement, and L. R. Grosenbaugh. Efficiency of several cruising designs on small tracts in north Arkansas. Jour. Forestry 54:569-576. 1956.

[2] Johnson, Floyd A., and Homer J. Hixon. The most efficient size and shape of plot to use for cruising in old-growth Douglas-fir timber. Jour. Forestry 50: 17-20. 1952.

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# "'Live track' steering isn't in International crawlers .

—Lyle Wimer,

**"I'm so sure that Planet Power steering,** with 'live' power on both tracks, is far superior to steering by 'killing' one track that I now use eight big International crawlers," states Lyle Wimer, Wimer Logging Co. "That's practically my entire equipment fleet for road-building and heavy logging.

"'Live track' steering isn't the only thing I like in the big International rigs, but it is the deciding factor. You just can't beat that planetary steering control."

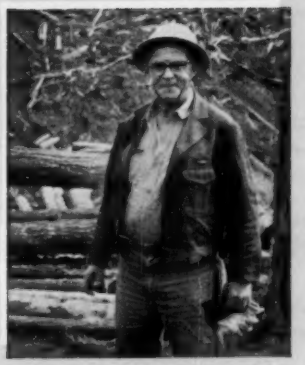
Four new TD-25's and four veteran TD-24's back Mr. Wimer's judgment with production records unmatched by loggers with king-sized clutch-steered rigs.

For example, a TD-25 on one Wimer mountain logging show yards as much Douglas fir as two clutch-steered crawlers of similar hp! The planet-powered "25" keeps both tracks pulling full time—for full-load turning. Load-limiting "dead track drag" is eliminated.

Planet Power-steering design also gives you on-the-go Hi-Lo power-shifting to match power to condition instantly—to save time in tough spots, gain it

# all I like . but it decides me,"

## Wimer Logging Co., Albany, Oregon



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# Points of View

## Comments on "Relationship Between Tree Spacing, Knot Size, and Log Quality in Young Douglas-Fir Stands"

Dr. Grah reported upon knot size of butt logs of 111 California Douglas-fir trees in the JOURNAL 59:270-272. During the past year data on natural pruning have been obtained for Douglas-fir growing in naturally established stands on the campus and Haney Forests of the University of British Columbia by Smith and Walters[1] and Smith, Ker, and Csizmazia.[2] These data show that, although tree quality can be controlled through spacing, size and age of individual trees should be considered in addition. Our data show an important influence of age and suggest that log quality, as determined by knot size and distribution in the early stages of stand development, will change over rotation periods of 60 to 80 years. Because the stands studied by Dr. Grah were originally very open it should be useful to consider data from the other end of the range of Douglas-fir and for stands of more average stocking.

A total of 184 of the largest young Douglas-fir in the U.B.C. Forests was measured to secure the data of Table 1. These trees averaged 19 inches in d.b.h. and 60 years in age. They were about 20 years older and of the same site index as the Douglas-fir studied by Dr. Grah. Averages, standard deviations, and minimum and maximum values are tabulated for 15 items. In addition, simple correlation coefficients (r) are given in Table 1 to express the association between each variable and item No. 5—the average diameter of the lowest dead branches on each of four quadrants, as well as item No. 14—the average height above ground of the lowest dead branches. With the exception of site index, all correlation coefficients are statistically significant; their relative importance varies directly as their squares. Apparently, the average distance to the nearest competing tree in each of four quadrants is much less useful than age and several items describing tree size.

When the length of bole free of dead branches was related to the variables of Table 1 by linear multiple-regression analysis, it was evident that d.b.h. and age together express most of the variation in natural pruning. The standard error of estimate of branch-free height is about 9 feet. The best single variable from which to estimate branch-free height is age; the best two are age and d.b.h.; the best three are age, d.b.h., and height, and the best four are age, d.b.h., height, and basal area per acre.

Branch diameters are more difficult to study and our data on these differ substantially from those of Grah. Referring to the trees described in Table 1, the average tree supported dead branches for a height of from 15 to 54 feet above the ground. These dead branches averaged 0.95 inches in basal d.i.b. with a standard deviation of 0.45 inches. The length of the bole covered by dead branches was governed primarily by tree d.b.h., age, and height. The ratio of tree height to crown width, along with basal area per acre, determined the percentage of tree height in dead crown.

There is little doubt that stocking, age, and tree size all influence the size of Douglas-fir branches. Ninety-two fully open-grown Douglas-fir trees at Haney had branches at about breast height which averaged 1.10 inches in diameter with a standard deviation of 0.41 inches. On the other hand,

[1]Smith, J. Harry G., and John Walters. Prune large, immature Douglas-fir now. U.B.C. Faculty of Forestry, Research Note No. 32. 6 pp. 1961.

[2]Smith, J. Harry G., John W. Ker, and Joseph Csizmazia. Economics of reforestation of Douglas-fir, western hemlock, and western red cedar in the Vancouver Forest District. U.B.C. Faculty of Forestry, draft copy of bulletin. 102 pp. 1961.

TABLE 1.—SUMMARY OF BASIC DATA AND INFLUENCE OF THESE ON NATURAL PRUNING OF DOUGLAS-FIR

| No. | Item | Ave. | S.D. | Min. | Max. | r: 5 on 1-15 | r: 14 on 1-15 | Percent of variance explained by variable in multiple regression analysis |
|---|---|---|---|---|---|---|---|---|
| 1 | D.b.h. (In.) | 19.0 | 9.6 | 6 | 50 | 0.59 | 0.64 | 8.1 |
| 2 | D.b.h. of Comp. (In.) | 12.8 | 6.4 | 0 | 37 | 0.49 | 0.65 | −0.8 |
| 3 | Dist. to Comp. (Ft.) | 15.6 | 9.9 | 0 | 38 | 0.23 | 0.29 | 0.7 |
| 4 | Dead Br. length (Ft.) | 1.8 | 1.4 | 0.5 | 8.8 | 0.20 | 0.27 | 0 |
| 5 | Dead Br. Diam. (In.) | 0.58 | 0.35 | 0.1 | 2.3 | 1.00 | 0.49 | 2.7 |
| 6 | Live Br. length (Ft.) | 9.4 | 3.7 | 1.5 | 22 | 0.39 | 0.50 | −0.1 |
| 7 | Live Br. Diam. (In.) | 1.3 | 0.6 | 0.3 | 3.3 | 0.48 | 0.29 | 1.4 |
| 8 | Total height (Ft.) | 110 | 44 | 29 | 236 | 0.46 | 0.70 | −1.1 |
| 9 | Total age (years) | 59.7 | 28.5 | 20 | 151 | 0.55 | 0.83 | 50.8 |
| 10 | Site index (Ft. @ 100) | 152 | 37 | 60 | 260 | 0.05 | 0.13 | 0.5 |
| 11 | Crown width (Ft.) | 21.5 | 7.3 | 8 | 40 | 0.50 | 0.27 | −1.7 |
| 12 | Ave. Crown Ht. (Ft.) | 71.5 | 38.7 | 6 | 190 | 0.46 | 0.75 | −1.2 |
| 13 | Basal area (Sq. Ft./Ac.) | 157 | 63 | 20 | 370 | 0.20 | 0.57 | 2.3 |
| 14 | Av. Ht. to dead Br. (Ft.) | 14.8 | 17.3 | 1 | 84 | 0.49 | 1.00 | — |
| 15 | Ave. Ht. to live Br. (Ft.) | 54.5 | 30.5 | 2 | 145 | 0.47 | 0.70 | 4.3 |

36 forest-grown Douglas-fir trees had branches in the first whorl above breast height that averaged 0.62 inches in diameter.

Average knot sizes in the top logs of 36 Douglas-firs felled in 70-year-old stands at Haney are given by the expression: $0.07\ D - 0.03$ where $D$ is d.b.h. in inches. Knots on ten 150-year-old Douglas-fir that were open-grown on site 160 averaged three inches in basal diameter (i.b.). All of these trees were free of branches beyond 21 feet and knots averaged only 1.4 inches at an average height of 41 feet, where the logs had an average d.o.b. of 31 inches. Average knot sizes on seventeen 30-year-old and sixty-three 80-year-old, dominant and quite open-grown, Douglas-firs were recorded for heights above ground of 0-5 and 6-19 feet (Smith and Walters).[1] Knot size increased directly with d.b.h. Only two 30-year and two 80-year trees had knots which averaged in excess of 1.5 inches between 6 and 19 feet above ground. All four of these had d.b.h.'s nearly three times the stand average. Fifty-two Douglas-firs in the 300-350-year class on site 120 were free of dead branches to an average height of 71 feet.

The best cultural control of knot size can be achieved by manipulation of crown width because branch diameter is influenced primarily by branch length which is in turn determined by crown width. In a sample of 76 Douglas-fir branches, 74 percent of the variation in d.i.b. of butts was associated linearly with branch length.

Smith and Ker[3] presented data on crown widths of Douglas-fir which showed that under fully open conditions there was an upper limit to width of crowns in relation to d.b.h. Because the ratio of crown width in feet to d.b.h. in inches ranges from about 3.0 in very young, open stands to about 1.0 in fully stocked stands it is obvious that age and stocking must be considered together in controlling branch diameter. Smith, Ker, and Csizmazia[2] concluded that the optimum stocking objective in extensive management of young Douglas-fir was open growth to a stand average d.b.h. of about 5 inches and gradual approach towards "normal" stocking at about 12 inches average d.b.h. This prescription would produce branches averaging about one inch in diameter and not over two. Because the height of crowns increases with age the largest branches will occur well above the butt logs.

If the differences between the British Columbia and California data cannot be explained by the initially open spacing of the California stands it may be that the B. C. provenance is genetically different. In any case it would be useful to have further investigations of the several factors controlling natural pruning throughout the range of Douglas-fir.

J. HARRY G. SMITH
*Faculty of Forestry, The University of British Columbia, Vancouver*

[3] Smith, J. Harry G., and John W. Ker. Growing Douglas-fir and western hemlock trees at desired rates. U.B.C. Faculty of Forestry. Research Note No. 24. 5 pp. 1960.

## What About Farm Forestry 1961?

Foresters have been struggling with the problem of forestry on the farm for the last 50 years or more. Our goal has been to make farm forests produce their share of wood products to meet national needs. We have spent much time, money, and energy trying to reach that goal.

It is my opinion, however, that after all these years we have made very little progress in solving the problem. I distinctly remember the discussion at the 1950 SAF meeting in Washington, D. C. Woodbridge Metcalf, extension forester from California, reported on a study that he had made throughout the nation on the status of farm forestry work up to that time. He told us that he had found very little to brag about—in fact almost nothing to show for our efforts. Some foresters, in spite of that record, wanted to put a great many more foresters to work at the same job. And to a limited extent, that was done—especially more farm foresters as contrasted with extension foresters. With the possible exception of the South, where the greatest increase in timber values has occurred, it is doubtful that we have much to brag about today, after another ten years of effort.

Forty years ago, there was much talk and acrimonious debate about proposed federal regulation of cutting on privately owned forest land. A great many foresters thought that was the only way the American people could insure a future supply of wood products. The prospect did indeed look grim.

The pressure for federal regulation was increased with renewed vigor along about 1940 but again failed to gain sufficient support for success. Now, after the passage of 40 years, without regulation—with only public-private cooperation and the aid of favorable economic factors; without a tremendous increase in federal appropriations, which federal regulation would have necessitated—we find that there is now every prospect of continuous production of wood products. That is, *except* from our farm forests. It would seem to be necessary to do something different about this problem; but what?

It has been proposed[1] that present federal-state cooperative assistance programs for technical assistance to farm and other small forest owners be accelerated by increased federal grants, and that greater emphasis be given to cost-sharing programs for tree planting, timber stand improvement, and certain other practices under the agricultural conservation program.

If such proposals were carried through, it would mean greatly increased technical forestry assistance, and payments to farmers to induce them to accept it. It would, in essence, be continuing, on a larger scale, what we have been doing for years. It is difficult to teach farmers to accept forestry as a farm activity by such methods. That has been pretty well established already. Of course, it is just possible that if such a pro-

[1] Reported in National Outlook. JOUR. FORESTRY 59:536. 1961.

gram were continued through several generations, some farmers would realize that, in the long run, there were some things to be gained by applying silvicultural practices and inaugurating a sustained yield program.

Largely this is commercial forestry, and the real difficulty in securing its adoption on the farm lies deep down in the agricultural fabric; it stems from pioneer days when forests were something to get rid of before farming could begin. The basic truth that farm forests can be managed and wood grown as a farm crop, thus enabling the non-arable land to assist the arable land in producing a farm income, has never been fully realized in all the long history of American agriculture. We have tried to apply the principles of commercial forestry to the growing of timber on farms, and it just does not work. Commercial forestry is inconsistent with the principles of farm economy. Farmers need an annual income from their farm crops; they use farm labor and machines in growing and harvesting those crops which they consider farm crops; and they do it with the assistance of various agricultural experts. The experts do not, however, take over the farmer's job; they merely advise him.

Perhaps that is the trouble. Foresters, of course, know better than farmers how to practice silviculture, to mark timber for cutting, to draw contracts for stumpage sales, to scale logs; but farmers can learn these things. They can learn by doing them. Here are four rules which, if followed, will enable farmers to become farm woodland managers—in effect, subprofessional foresters:

1. The farmer must accept the responsibility for the management of his own woods; he must mark his timber for cutting; he must sell it—scale it, measure it (all with the advice of foresters)—*exactly as he grows and harvests other farm crops.*

2. He must forget about stumpage and cut and sell products.

3. He must use farm labor to process wood products.

4. He must cut annually, in amounts approximating the growth of his forest.

This is what we mean by "growing wood as a farm crop." What a relatively few farmers have learned to do, the majority of farmers can do, once they understand it is expected of them—once they accept wood as a farm crop. In my opinion, the big reason why so little progress has been made in farm forestry is that our goal has been commercial forestry instead of wood as a farm crop. Of course, commercial forestry principles and procedures are applicable to some forests owned by farmers. Some have timber holdings of sufficient size and value that the fact of farm ownership can and should be given little consideration in planning a sustained yield program. Where such conditions exist, the present educational system does result in some success. But for the vast majority of farm woodland owners, commercial forestry practices simply mean stumpage sales to the wood buyer and destruction to the farm woods. Seldom does the farmer get the idea of wood as a farm crop—*his farm crop!*

We need to change the emphasis in our educational system from silviculture to farmer tree selection; from stumpage to wood products; from contract sales of standing timber to sawlogs, pulpwood, posts, and fuel; from cutting when the log buyer makes an offer to *annual* cutting of what farm labor can handle and what the farmer decides should be cut.

This means heavy emphasis upon getting the cooperation of the wood buyers and the wood industries, education of the market to fit the needs of farmers who grow wood as a farm crop.

Such a program does not call for big federal appropriations. We need money, too, for other things besides forestry—to abate stream pollution, for foreign aid, for defense, and above all, we need to begin making an effort to pay off our public debt. We need for this forestry job, vitally, the help of all agricultural technicians—foresters cannot do the job alone. Let us revise our thinking about farm forestry education and ask for help from the whole agricultural fraternity.

From time immemorial it has been the custom of those responsible for promoting and administering programs for the general good (and I particularly refer to resource development and management) to think first of the federal treasury.

Farm forestry, in my opinion, is not in need of big spending—it needs a different program of education to build a foundation, a favorable climate in which farmers will learn to grow wood as a farm crop.

First of all let us talk common sense in education and secure the cooperation of agricultural workers—that is the foundation we lack now. It cannot be built with commercial forestry practices. It cannot be purchased with federal cash. But it can be obtained by a concerted and sustained effort on the part of agriculturists—workers, farmers, educators, farm editors, economists—wood buyers, the wood industries, the conservationists, and the foresters.

It would be sad indeed if we should spend a lot of money and help increase our public debt only to find, after another ten or twenty years, that we were no further along on a farm forestry program than we are now.

JOHN F. PRESTON
*Washington, D. C.*

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# Book Reviews

**New Laws for New Forests: Wisconsin's Forest-Fire, Tax, Zoning, and County-Forest Laws in Operation**

By Erling D. Solberg. 611 pp. Illus. The University of Wisconsin Press, Madison. 1961. $7.50.

The State of Wisconsin was an acknowledged leader among the states in taking political action to secure r a t i o n a l land use in its northern forest area following initial logging. Prior to the 1920's such action was largely ineffectual and often contradictory, for public opinion was concerned with converting all of the northern forests to farms. The impossibility of this goal became apparent to nearly everyone in the late 1920's. At this time the people of Wisconsin took characteristically v i g o r o u s measures through constitutional amendments and statutes to stem the waste of resources and provide an economic base for the development of the North.

In this book Erling Solberg, a specialist in rural zoning and land use regulations for the U. S. Department of Agriculture, traces the origins of four groups of forest restoration laws and the development of programs that followed them. The four areas examined are fire protection, the Forest Yield Tax (Forest Crop Law), the County Forest Law, and rural zoning. Emphasis is on legal and political arrangements made, and on economic and social results. Each group of laws is appraised in the context of problems it was designed to solve, and then discussed in connection with new problems that have arisen—some of them as a result of the laws themselves. Drawing on an intensive study of programs in Oneida County, the author suggests changes in laws and administration.

The parts of the book of most immediate interest to foresters are the chapters dealing with the financial effects of the Forest Crop Law in its application to both private owners and counties. The author presents calculations showing that on many areas the state will not recoup its investment of financial aids to the local governments, and that total taxes are so high that they would tend to discourage private forestry. Although *ad valorem* taxes with which the Forest Crop Law competes were drastically reduced when the latter became available to owners, they are now rising again because of the recognition of recreational and other values. Thus, the squeeze is reestablished on an owner's potential profits; and the Forest Crop Law does not provide an adequate es-


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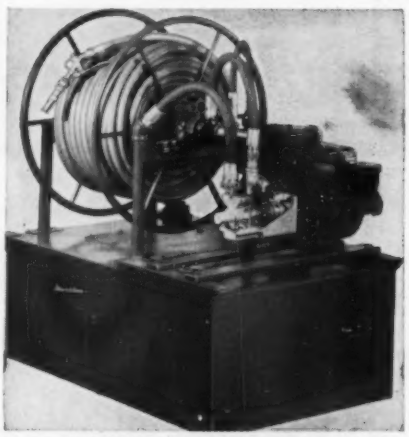

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**New York 17, N. Y.**

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cape. Under the Forest Crop Law's present provisions, county forest lands may be expected to pay off the state's investment rather readily, and could offer the counties a financial inducement to end their historically satisfactory cooperative forestry relationship with the state. Solberg advances several possible modifications of the Law and shows how each might affect the financial position of the state, local governments, and private owners.

This is a long book—611 pages including 224 pages of appendix, notes, and index. It is carefully and logically written with enough repetition to keep the reader aware of the inter-relationships of the different programs. Errors in forestry facts and terminology are extremely few. Those who are not particularly concerned about public policy toward forestry may find their interest lagging in places, although the introductory paragraphs to chapters as well as others throughout the text have a compelling sweep and style. In addition to recognizing its value as an historical record, most foresters should find it helpful in increasing their understanding of some of the long-range problems of forest financial planning.

JAMES T. MORGAN
*Lake States Forest Expt. Sta., St. Paul, Minn.*

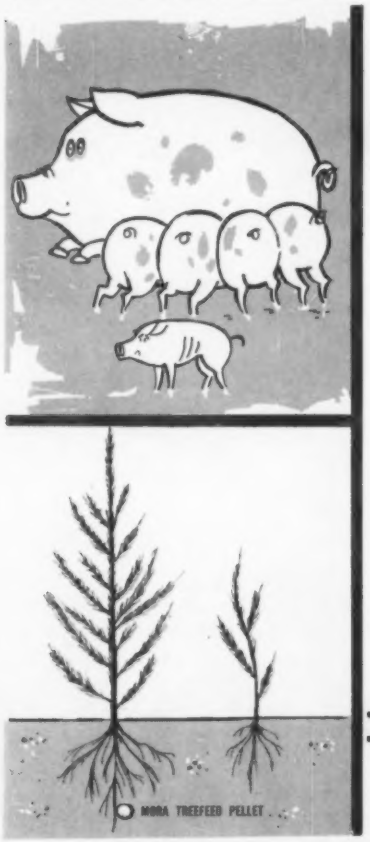
### The Woody Plants of Ohio

By E. Lucy Braun. 362 pp. Illus. Ohio State University Press, Columbus. 1961. $7.50.

Not only Ohioans but plant lovers everywhere will welcome this splendid book prepared by one of America's foremost botanists and plant ecologists, and jointly sponsored by the Ohio Academy of Science and the National Science Foundation. Termed "a contribution toward the vascular flora of Ohio," it catalogs and describes the trees, shrubs and woody climbers native, naturalized, or escaped, as meticulously as did the late C. C. Deam in his admirable *Trees of Indiana* and *Shrubs of Indiana* (1932). It includes all woody plants, whether local or widespread, known to occur naturally in Ohio.

Of immeasurable value are Miss Braun's state-county maps charting separately the distribution of almost 350 indigenous species, each duly verified through herbarium specimens, and distinguished in the text by names in boldface type. Approximately 50 of these are sufficiently rare to inhabit but one county, oftentimes one locality, because various species in the Buckeye State occupy the margins of their respective ranges. In addition, one notices the names of about 95 adventives (exotics) entered in small caps.

This monumental treatise has 90 full-page line drawings of Ohio's woody flora representative of year-round conditions. Beautifully executed and with fidelity to details, these depict the salient features stressed in the keys. Characters such as leaves, fruits and winter twigs, pertinent to field recognition, receive emphasis. Compared (usually) on one plate are 2 to 8 similar species.

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The author, professor emeritus of plant ecology at the University of Cincinnati, presents detailed summer and winter keys to Ohio's woody genera, and some 90 different keys to species. No key to families is given. A synopsis of these keys, plus an index to genera in the keys, greatly facilitates one's identification of an unknown specimen. Technical descriptions are reduced to a minimum, for seldom are distinguishing characteristics from the keys repeated under species discussions.

With few exceptions, the nomenclature accords with that in Gray's *Manual of Botany*, eighth edition (Fernald, 1950). Latin synonyms often are given. Accepted common names comprise those in general use.

There is a preface by Dr. Braun followed by an introduction devoted to records, Ohio herbaria, floras or checklists previously published, nomenclature, and scientific and common names. Next comes a 10-page section (with 4 plates) on Descriptive Terms painstakingly done and giving over 150 examples (references to genera, species, chapter plates, or page numbers).

A 14-page analysis (with 10 maps) of the Vegetation of Ohio and Correlation with Environment is an engrossing discussion of Ohio's forest types. It explores each local environmental factor (climatic, geologic, physiographic, edaphic, biotic) affecting forest distribution, and reflects the author's intensive studies of this subject over the past 30 years, well known through her *Deciduous Forests of Eastern North America* (1950).

Keys to Genera, and an Index to Genera in the Keys, occupy 25 pages. The Systematic Text itself, arranged phylogenetically and including a wealth of botanical lore, totals 275 pages. In all, 55 families, 338 agencies, 43 hybrids, and some 200 varieties and forms are dealt with. There follows a Glossary, a List of Abbreviations of Authors, Literature Cited, a General Index, and a complete cross-referenced Index to Plant Names.

A scholarly presentation printed on excellent quality paper and meticulously proofread, this eminently useful book gives the reader accurate and complete taxonomic descriptions and distribution patterns of the woody perennials of Ohio. It is 7¾ inches × 10¾ inches, attractively bound in forest-green cloth, and displays a gold etching of the state tree—Ohio Buckeye—on its front cover. The reviewer considers it one of the very best of the many woody plant identification guides.

JOHN AUGHANBAUGH
*Ohio Agric. Expt. Sta., Wooster*

### Measurements for Engineering and Other Surveys

By Michael V. Smirnoff. xii+556 pp. Illus. Prentice-Hall Civil Engineering and Engineering Mechanics Series. Prentice-Hall, Inc., Englewood Cliffs, N. J. 1961. $9.75.

Any forester having an occasion to make measurements of an engineering or surveying nature will find this volume a desirable addition to his library. Designed pri-

(*Continued on page* 694)

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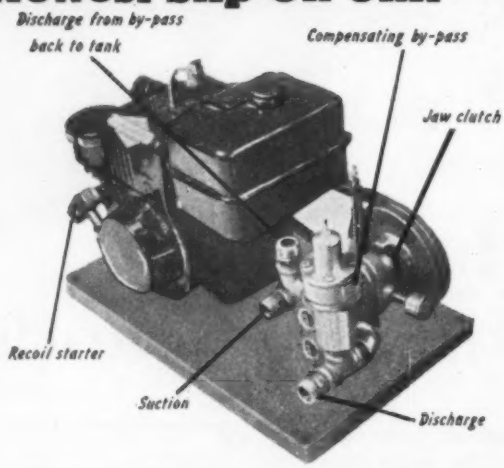


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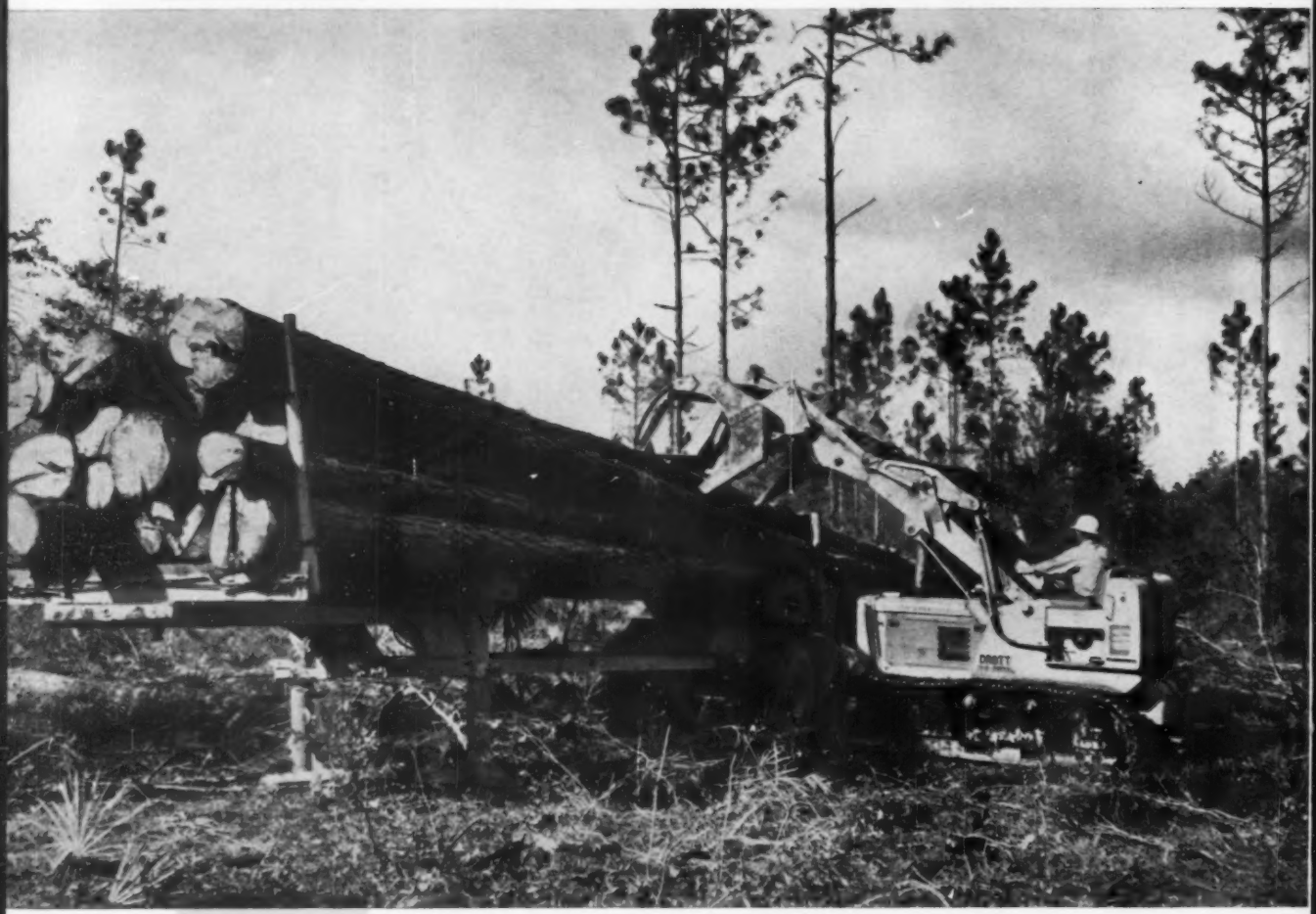

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marily for use as a textbook for civil engineers, the book not only presents the subject matter in an unique, systematic, and excellent manner for classroom and field instruction, but also lends itself very well for self instruction.

The book presents the theoretical approach to measurements in the odd numbered chapters. Field instructions in the use of surveying instruments and equipment used in making the measurements are presented in the even numbered chapters. Also included are such topics as electronic measuring instruments, photogrammetric methods in surveying, engineering astronomy, plane table, mine surveys, hydrographic surveys, traverse error of closure adjustments and area computations, and an explanation of the use of the State Grid Systems of plane coordinates. Very brief discussions on slide rule instructions, public land surveys, and property surveys are included in the appendix, together with the usual logarithm tables and natural trigonometric function tables. The tables are printed in a type that is clear and easy to read.

The chapters on theory are the most comprehensive of any I have ever seen. Definitions are clear and concise. Topics such as precision and accuracy, significant figures, theory of errors, repeated measurements, etc., are covered thoroughly. Throughout the book, the subject of errors is very well covered. There is one chapter devoted to a dissertation on accidental or random errors, and each chapter on measurements, such as distances, angles, elevations, and so forth, has an excellent treatise on errors peculiar thereto.

These chapters also present information on all the various types of instruments and equipment used to make measurements and their capabilities and limitations.

The field instruction chapters are also quite complete and comprehensive. Instructions include explanations of how to use everything from a rod level to transits or plane tables. The practical applications of surveying measurements are also discussed, including the drafting of maps of various kinds.

A most interesting and useful feature of the book, both to the instructor or student and the person who may be learning by self instruction, is the problems given at the end of the chapters on theory and the recommended field exercises found at the end of the chapters on field instructions. In all problems, three sets of data are given and the answers to Set A are given. The field instructions are clear, explicit, and fully set forth all procedures in making the various measurements.

I would recommend this book to the forester who may be engaged in any surveying, from the most elementary to the highest order. Most particularly, the discussion on errors throughout the book is a very clear and complete coverage of this topic.

KENNETH E. BEIL
*Greenacres, Inc., Seattle, Wash.*

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**FOREST PATHOLOGY**

by

John S. Boyce

Yale University

**Years of experience as a teacher and investigator in forest pathology have enabled the author to create a book combining the best qualities of text and reference. The approach to tree diseases is based on the parts of the tree affected and on tree species, with the sequence of diseases caused by pathogens roughly following the life of the tree from seedling to maturity. This is a natural arrangement which is easy for a non-specialist to follow; information on a single disease is in one place, and each disease is carefully documented so that sources of additional information can be readily determined.**

**This book is intended for courses in forest pathology at the university level. In its two previous editions it was used extensively not only by students, but by practicing forest and plant pathologists, foresters, and timberland owners.**

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**Tree-Sort: The Pocket Tree Computer**

By Joseph E. Forester. 156 individual cards. (In plastic storage box.) Illus. The Sort-Card Company, Boulder, Colo. 1961. $6.

Punch cards and perforated tapes are now commonly used to analyze, program, and record myriad types of data. The use of punch cards, be they either hand or machine processed, is also playing an increasingly important role in the botanical sciences. The New York Botanical Garden, for example, is now indexing the nomenclature of all the plants of the world for later publication in a master catalog—an index of some 1,700,000 plant names.

On a more modest scale, Mr. Forester has assembled a very attractive and useful set of dendrological identification aids on a series of 3 inches by 8 inches punched cards. The data on these cards describes the features of 260 native and exotic trees growing in North America, exclusive of Mexico. The obverse faces or index sides of these cards are identical and are subdivided into the following morphologic categories: broadleaves (with netted or parallel venation), needle or scalelike leaves, fruits, armed twigs, distribution in the eastern or western United States, and whether they are evergreen or deciduous. These categories and their further subdivisions provide the basis for identification of the species. The reverse faces bear from one to three species descriptions which usually include illustrations of the foliage, cone or fruit, tree silhouette, distribution map, and occasionally an example of the twig or inflorescence. When two or three species appear on one card, sufficient differences are described to separate similar trees. The illustrations, although rather small, are distinct enough to be easily recognizable. In general, Forester's tree distribution maps are of value but several, such as *Betula lenta, Gymnocladus dioicus,* and *Gleditsia triacanthos,* seem to be in error.

Separation of the cards after the sorting needle has been inserted in the proper hole requires some care to be certain all the pertinent cards drop from the pack. A visual check along the top of the pack, however, usually discloses any cards that are stuck. The quality of the paper in the cards is good and they should stand up under considerable wear. Although the cards are punched and notched for an alphabetical index, a master list of all the species included in the set would be of aid to the user. Laying out all the cards to see what is present would be a bit time consuming. *Tree-Sort* should be of value in the teaching laboratory, and in the field if the cards are kept dry and are not blown away by the wind.

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# Current Literature

*Compiled by* LOIS MCALLISTER, *Assistant Librarian, State University College of Forestry at Syracuse University*
*Range Management Section Compiled by* NELLIE G. LARSON, *Library, U. S. Department of Agriculture*

### General

*The Life of the Green Plant.* By A. W. Galston. 116 pp. Illus. Prentice-Hall, Inc., Englewood Cliffs, N. J. 1961. Foundations of Modern Biology Series. $2.95.

*Resource-Use Education: Children, Classrooms and Conservation.* By G. L. Fersh. 21 pp. Joint Council on Economic Education, 2 W. 46th St., New York 36, N. Y. 1961.

*Some Shade and Flowering Trees for Pennsylvania Landscapes.* By J. L. Hayden. 15 pp. Illus. Agric. and Home Economics Extension Serv., Pennsylvania State University, University Park. 1961. Spec. Cir. No. 57.

### Forest Economics

*A Method of Appraising Pine Sawtimber in South Carolina.* By W. C. Anderson. 15 pp. Illus. Southeastern Forest Expt. Sta., Asheville, N. C. 1961. Sta. Paper No. 122.

*Trends in Forest Taxation.* By E. T. Williams, Pp. 113-144 (National Tax Journal, June, 1961) Available from the author, Division of Forest Economics Research, U. S. Forest Service, Washington 25, D. C.

### Forest Management

*Average Growth Rates in the Spruce-Fir Region of New England.* By C. A. Bickford, F. R. Longwood, and Robert Bain. 23 pp. Tables. Northeastern Forest Expt. Sta., Upper Darby, Pa. 1961. Sta. Paper No. 140.

*Estimation of Form Class from Lower Bole Measurements for Southern Red Oak, White Oak and Shortleaf Pine in the Upper South Carolina Piedmont.* By N. B. Goebel. 3,[4] pp. Tables, diagram, South Carolina Agric. Expt. Sta., Dept. of Forestry, Clemson. 1961. Forest Research Series No. 2.

*Managing Mountain Hardwoods—a Ten-Year Appraisal.* By G. R. Trimble, Jr. 25 pp. Illus. Northeastern Forest Expt. Sta., Upper Darby, Pa. 1961. Sta. Paper No. 143.

*Recognition of Tree Species on Air Photographs by Crown Characteristics.* By L. Sayn-Wittgenstein. 56 pp. Illus. Canada Dept. of Forestry, Ottawa. 1960. Forest Research Division Tech. Note No. 95.

### Land Use

*Nineteenth Short Course on Roadside Development, October 4-7, 1960.* 156 pp. Illus. Dept. of Landscape Architecture, Ohio State University and Ohio Dept. of Highways, Columbus. 1961.

*The Squeeze: Cities Without Space.* By Edward Higbee. 348 pp. William Morrow & Co., New York 16, N. Y. 1960. $5.95.

*Wilderness: the National Forests, America's Playgrounds.* By the U. S. Forest Service. [13] pp. Illus. U. S. Dept. of Agriculture, Washington 25, D. C. 1961. PA No. 459. 20 cents (Govt. Printing Office).

### Logging and Milling

*Effect of Defect Placement and Taper Setout on Lumber Grade Yields When Sawing Hardwood Logs.* By F. B. Malcolm. 8,[9] pp. Tables. U. S. Forest Products Lab., Madison 5, Wis. 1961. FPL Report No. 2221.

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The forester faces a real challenge in his work with mankind. The forest primeval existed long before man arrived on this continent and, despite floods, fires, diseases, and animals, it survived until people threatened it. People want this area set off for recreation, some want that area reserved for camping only, others insist on another huge area for nothing to encroach upon. This group demands action now, that group says the shortage of wood will be critical in a few years. Each minority group has its own ideas and methods of expressing them. Each wants action today, not knowing what the future may bring.

So in effect the forest and forester are in danger of being overwhelmed with a people problem. Since the trees cannot speak (they would probably pack their trunks and leave if they could), the burden of defense rests with the forester. Some will say that action speaks louder than words, but this is one area where action and discussion must go hand in hand. Who is better qualified than the forester to present the mutual advantages of multiple uses of a well-managed forest to the public and industry.

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*Seasoning and Surfacing Degrade in Kiln-Drying Western Hemlock in Western Oregon.* By A. C. Knauss and E. H. Clarke. 11 pp. Tables. Pacific Northwest Forest and Range Expt. Sta., Portland, Ore. 1961. Research Note No. 207.

*Work Sampling Method Applied to Logging—a Powerful Tool for Performance Analysis.* By L. J. Lussier. 7 pp. Tables. Canadian Pulp and Paper Association, Woodlands Section, Montreal 2. 1961. Woodlands Section Index No. 2045.

### Pathology

*Copper Tolerance of Some Wood-Rotting Fungi.* By G. Y. Young. 7,[2] pp. Table, chart. U. S. Forest Products Lab., Madison 5, Wis. 1961. FPL Report No. 2223.

*Relative Aeration Requirements by Soft Rot and Basidiomycete Wood-Destroying Fungi.* By C. G. Duncan. 6,[5] pp. Tables, charts. U. S. Forest Products Lab., Madison 5, Wis. 1961. FPL Report No. 2218.

### Protection

*Caterpillars on Oaks.* By Stephen Hitchcock. 15 pp. Illus. Connecticut Agric. Expt. Sta., New Haven. 1961. Bul. No. 641.

*Douglas Fir Beetle: a Problem Analysis.* By N. E. Johnson. 19 pp. Weyerhaeuser Co., Forestry Research Center, Centralia, Wash. 1960. Forestry Research Note No. 29.

*Scales and Mealybugs.* By J. C. Schread. 11 pp. Illus. Connecticut Agric. Expt. Sta., New Haven. 1961. Cir. No. 216.

*Spruce Budworm in the Western United States.* By J. M. Whiteside and V. M. Carolin, Jr. 8 pp. Illus. U. S. Forest Service, Washington 25, D. C. 1961. Forest Pest Leaflet No. 53.

### Range Management

*Forage Management in the Northcentral Area.* By Dale Smith. 154 pp. Illus. W. C. Brown Book Co., Dubuque, Iowa. 1960. $3.25.

*Free Livestock Range in Missouri.* By A. Brohn and T. S. Baskett. 4 pp. Maps. Missouri Agric. Expt. Sta., Columbia. Jan. 1961. Bul. No. 761.

*Nebraska Handbook of Range Management.* By D. F. Burzlaff. 35 pp. Illus. Nebr. Agric. Exten. Serv., Lincoln. Jan. 1961. E. C. No. 60-131.

*Production Characteristics of Oklahoma Forages; Grazing Characteristics and Clipping Responses of Bermudagrass.* By W. C. Elder and H. F. Murphy. 23 pp. Oklahoma Agric. Expt. Sta., Stillwater. Apr. 1961. Bul. No. B-577.

*Range Improvement; Progress Report, 1959.* By Forage Crops Staff, Dept. of Agronomy. 24 pp. Oklahoma Agric. Expt. Sta., Stillwater. Mar. 1961. Processed Ser. No. P-371.

*Receding Grassland Ranges in the Interior of British Columbia.* By A. McLean and Others. 12 pp. Illus. Canada Dept. Agric., Res. Branch, Ottawa. Apr. 1961. Pub. No. 1108.

*Row Spacing Affects Yields of Forage Grasses in the Brown Soil Zone of Saskatchewan.* By M. R. Kilcher. 11 pp. Illus. Canada Dept. Agric., Res. Branch, Ottawa. Apr. 1961. Pub. No. 1100.

### Silviculture

*Black Locust—a Bibliography.* By D. T. Funk and B. A. Roach. 40 pp. Illus. Central States Forest Expt. Sta., Columbus, Ohio. 1961. Misc. Release No. 33.

*Chemical Control of Brush in Ponderosa Pine Forests of Central Oregon.* By W. G. Dahms. 17 pp. Illus. Pacific Northwest Forest and Range Expt. Sta., Portland, Ore. 1961. Research Paper No. 39.

*Chemical Control of Weeds in Nursery Plantings.* By J. F. Ahrens. 41 pp. Illus. Connecticut Agric. Expt. Sta., New Haven. 1961. Bul. No. 638.

*Thinning in the Douglas-Fir Region.* By E. C. Harris and R. W. Dingle. 30 pp. Washington Agric. Expt. Station, Pullman. 1961. Station Cir. No. 385.

### Wildlife Management

*Fishery Resources for Animal Food; Reprints of Ten Magazine Articles.* 22 pp. Illus. U. S. Fish and Wildlife Service, Washington 25, D. C. 1960. Fishery Leaflet No. 501.

*A Naturalist in Alaska.* By Adolph Murie. ca. 320 pp. Illus. Devin-Adair Co., New York 10. 1961. American Naturalist Series. $6.

### Wood Technology and Utilization

*Properties of Timbers Imported into Australia.* By N. H. Kloot and E. Bolza. 79 pp. Table. Commonwealth Scientific and Industrial Research Org., Melbourne, Australia. 1961. Division of Forest Products Technological Paper No. 12.

*The Story of Hardboard.* 16 pp. Illus. American Hardboard Assoc., 205 W. Wacker Dr., Chicago 6, Ill. 1961.

*Working Stresses for Structural Laminated Timber.* By W. T. Curry. 50 pp. Illus. Her Majesty's Stationery Off., York House, Kingsway, London W.C. 2, England. 1961. Dept. of Scientific and Industrial Research, Forest Products Research Special Report No. 15. 4s.

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## The Biennial Elections

On September 16 nominations close for SAF president and for members of the Council. (So also do nominations for Fellow in the SAF.) Ballots will be mailed out to voting members on October 16 and the elections will be held on December 2. The November issue of the JOURNAL will carry the photographs of nominees for president and for the Council, as a matter of record and for the information of the membership.

### Nominations Received

On the date of going to press the following nominations had been received:

#### For President

B. E. Allen, Savannah, Ga. (Council Member 1956-1957, 1958-1959, 1960-1961.)

Paul M. Dunn, New York, N. Y. (Council Member 1946-1947, 1948-1949.)

J. Herbert Stone, Portland, Ore. (Council Member 1954-1955, 1956-1957, 1958-1959.)

#### For the Council

William C. Bramble, Lafayette, Ind. (Council Member 1960-1961.)

Milton M. Bryan, Washington, D. C.

Gene L. Butcher, Frankfort, Ky.

Donald E. Clark, Denver, Colo. (Council Member 1958-1959, 1960-1961.)

Robert H. Clark, Fordyce, Ark.

George W. Dean, Charlottesville, Va.

F. T. Frederickson, International Falls, Minn.

W. D. Hagenstein, Portland, Ore. (Council Member 1958-1959, 1960-1961.)

Svend O. Heiberg, Syracuse, N. Y. (Council Member 1960-1961.)

George M. Jemison, Washington, D. C.

Dahl J. Kirkpatrick, Albuquerque, N. Mex.

Carl G. Krueger, Coeur d'Alene, Idaho.

Charles H. Lewis, Jr., Alexandria, La.

Walter H. Lund, Portland, Ore.

William A. Parr, Bel Air, Md.

Archie E. Patterson, Athens, Ga.

Burnett H. Payne, Washington, D. C.

Richard J. Preston, Jr., Raleigh, N.C. (Council Member 1960-1961.)

Kenneth J. Seigworth, Norris, Tenn.

John F. Shanklin, Washington, D C.

Stephen H. Spurr, Ann Arbor, Mich.

Russell C. Stadelman, Memphis, Tenn.

John A. Zivnuska, Berkeley, Calif.

Eugene V. Zumwalt, Washington, D. C.

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#### For Fellow

Frank A. Albert, Jacksonville, Fla.

Robert S. Campbell, New Orleans, La.

Nathan D. Canterbury, Houston, Texas.

Donald E. Clark, Denver, Colo.

Kenneth P. Davis, Ann Arbor, Mich.

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Thomas C. Evans, Asheville, N. C.

Reginald D. Forbes, Ambler, Pa.

S. A. Graham, Ann Arbor, Mich.

Lewis R. Grosenbaugh, Berkelely, Calif.

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J. V. Hofmann, Raleigh, N. C.

Wallace I. Hutchinson, Sherman Oaks, Calif.

George M. Jemison, Washington, D. C.

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Edward I. Kotock, Walnut Creek, Calif.

Fred H. Lang, Little Rock, Ark.

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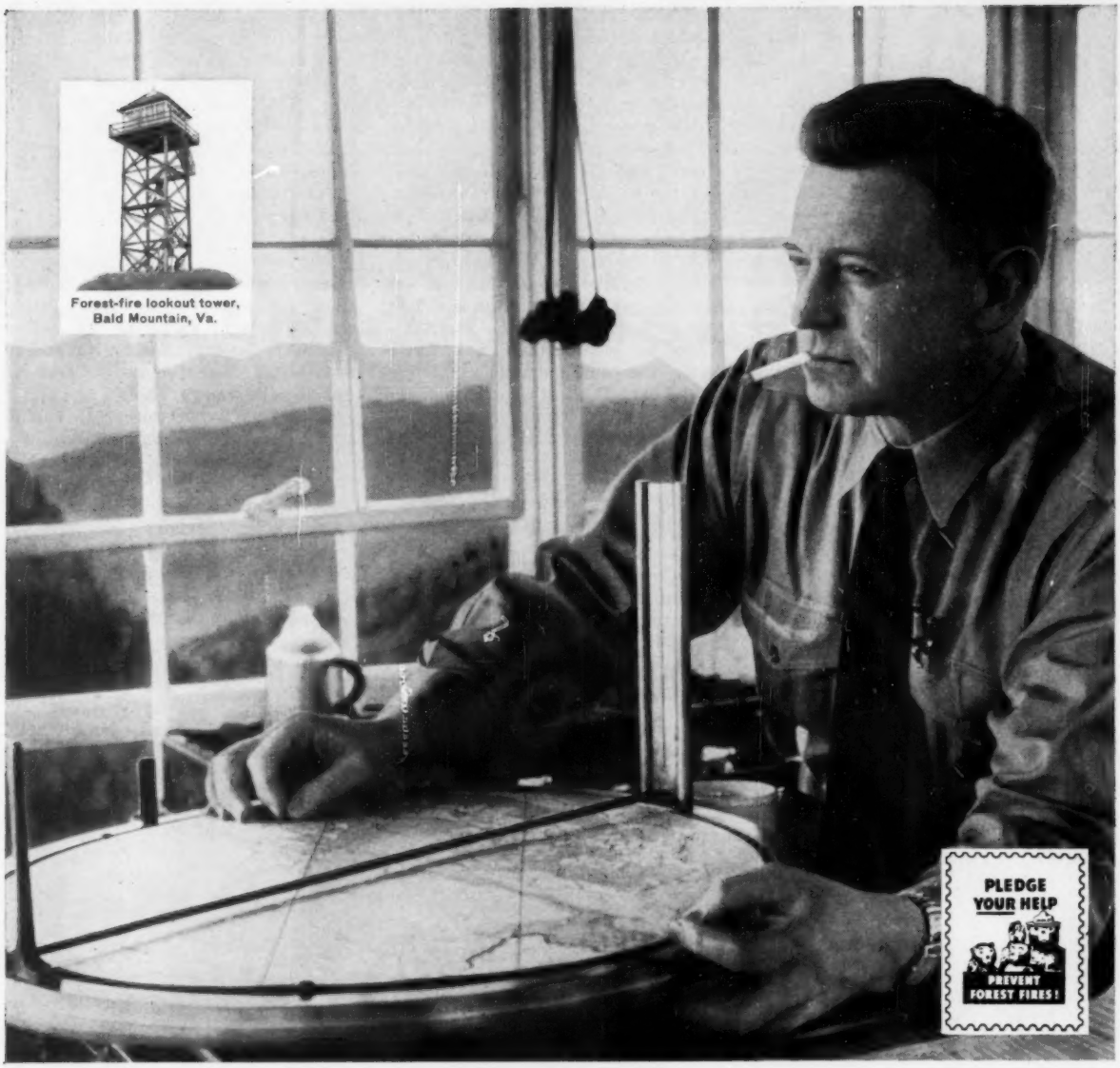


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Calvin B. Stott, Milwaukee, Wis.
Ray F. Taylor, Juneau, Alaska.
Charles L. Tebbe, Missoula, Mont.
Allen E. Thompson, Seattle, Wash.
Albert E. Wackerman, Durham, N. C.
George O. White, Jefferson City, Mo.
Ernest Wohletz, Moscow, Idaho.

## Council's Column

### Section Delegates

In recent months much has been said and written concerning the matter of "Communications" within our Society. This is as it should be, for the matter of communications—the transmittal of the word from the parent Society to the Sections, to the membership and then back up the line—is most important. And it is quite difficult, with our geographical diversity, large membership, and infrequent meetings. Any organization consisting of two or more persons has a communications problem, and ours is just compounded accordingly.

One of the most far-reaching steps to establish better liaison between Council and Sections was undertaken with the beginning of the joint meeting of Section delegates and Council members on the Sunday afternoon prior to the annual national meeting. Historically the Council has had two meetings per year. The first is usually held in the spring of the year. The second has been on the Sunday immediately preceding the national meeting. In the past, it was the exception, and not the rule, that a Section delegate under specific instructions from his home Section, would present his views, his resolutions, his arguments before the full Council. Now it is just a matter of being in the joint session.

This arrangement will produce no better results than before unless the Section delegate is carefully chosen, is instructed in what his Section wants presented, and is capable of standing up in a joint session and delivering his point. He should also be well aware of the problems (if any) or issues his Section desires to be considered. This makes it incumbent on the Section back home to exercise prudent judgment in selecting its delegate.

It is in this area of proper instruction of the Section delegate that will make—or break—the joint sessions of Council and delegates. It is this writer's suggestion that emphasis be placed on this point and further that the machinery to insure such be set in motion.

Many Sections do not have their annual meeting at a time that would allow for action to be immediately carried forward via a Section delegate to the national meeting. But every Section has an Executive Committee, staffed with sincere, earnest and diligent professional foresters. It would appear that from the business meetings of the Sections the Executive Committee should analyze the points under consideration, the philosophies to be explored, the professional opinions aired, and from that pick the delegate and instruct him accordingly.

Speaking as a Council member of six years experience, it would be a very real opportunity for the members of the Council to learn the feelings of the membership on any issue, if the joint session had positive expressions from the delegates on any


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issue of importance at that time. For instance, in the next few months all indications are that there will appear on the scene a massive federal subsidization program designed to assist the small landowner to grow trees. As a professional organization, we should have a collective opinion on the merits or demerits of such a scheme. While each member of the Council has his own private opinions on the issue, he is under a solemn obligation to review such in the light of what the professional membership wants. The joint session of delegates and Council is the proper place for this sounding board to operate.

The Society of American Foresters is a great organization. It is composed of foresters, run by foresters—for foresters. It is a potent voice in our democracy on issues, programs or projects that affect the practice of the profession of forestry. It will be just as strong and as powerful as the members care to make it. Well-selected, informed, articulate, and dedicated Section delegates are required to maximize our intelligent appraisal and evaluation of what is best for the Society. We believe each Section will measure up to its responsibilities.

B. E. ALLEN

SAF MEMBERSHIP BY SECTIONS, JUNE 30, 1961

| | Section | Rank | Total | Junior | Member | Fellow | Affiliate | Associate | Student |
|---|---|---|---|---|---|---|---|---|---|
| 1. | Alaska | 22 | 114 | 53 | 53 | 1 | 4 | 3 | — |
| 2. | Allegheny | 7 | 755 | 256 | 366 | 3 | 21 | 10 | 99 |
| 3. | Appalachian | 3 | 992 | 324 | 507 | 6 | 59 | 5 | 91 |
| 4. | Central Rocky Mountain | 16 | 304 | 115 | 164 | 1 | 8 | 4 | 12 |
| 5. | Central States | 12 | 420 | 136 | 215 | 1 | 14 | 5 | 49 |
| 6. | Columbia River | 2 | 1,483 | 611 | 686 | 6 | 105 | 15 | 60 |
| 7. | Gulf States | 4 | 986 | 290 | 470 | 3 | 152 | 20 | 51 |
| 8. | Inland Empire | 17 | 302 | 105 | 115 | 3 | 20 | 4 | 55 |
| 9. | Intermountain | 15 | 335 | 122 | 143 | 1 | 15 | 2 | 52 |
| 10. | Kentucky-Tenn. | 19 | 280 | 98 | 163 | — | 13 | 6 | — |
| 11. | New England | 9 | 659 | 171 | 318 | 8 | 69 | 12 | 81 |
| 12. | New York | 13 | 394 | 117 | 208 | 8 | 28 | 11 | 22 |
| 13. | Northern Calif. | 6 | 902 | 301 | 475 | 11 | 52 | 17 | 46 |
| 14. | Northern Rocky Mountain | 14 | 344 | 116 | 152 | — | 21 | 5 | 50 |
| 15. | Ozark | 11 | 502 | 162 | 196 | 1 | 104 | 5 | 34 |
| 16. | Puget Sound | 8 | 747 | 292 | 293 | 8 | 85 | 18 | 51 |
| 17. | Southeastern | 1 | 1,562 | 539 | 750 | 6 | 79 | 18 | 170 |
| 18. | Southern Calif. | 21 | 125 | 52 | 58 | 3 | 9 | 3 | — |
| 19. | Southwestern | 20 | 267 | 76 | 164 | 1 | 25 | 1 | — |
| 20. | Upper Mississippi Valley | 10 | 527 | 165 | 202 | 3 | 35 | 10 | 112 |
| 21. | Wash., D. C. | 18 | 295 | 33 | 219 | 11 | 6 | 26 | — |
| 22. | Wis.-Mich. | 5 | 903 | 279 | 415 | 2 | 63 | 16 | 128 |
| | No Section Affiliation* | 315 | 75 | 214 | 7 | 11 | 6 | 2 | |
| | Corresponding Members | 169 | — | — | — | — | — | — | — |
| | Honorary Members | 16 | — | — | — | — | — | — | — |
| | Total Membership | 13,698 | 4,488 | 6,546 | 94 | 998 | 222 | 1,165 | |

*Includes members in U. S. and foreign countries who have requested that they not be designated as members of any Section.

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## Registration and Licensing of Foresters Moves Forward

Two additional forester registration and licensing bills have recently been passed; one by the legislature of South Carolina, the other by the legislature of Florida. Both acts have been signed into law by the governors of the respective states. These acts serve to block in the four southeastern states of Alabama, Georgia, South Carolina, and Florida for state registration and licensing of foresters. The passage of the Florida act also serves to make the Southeastern Section of the SAF, the first Section to have registration and licensing over its entire area.

Those foresters who have tried and failed to get a registration act passed in their states should take heart from the experience of foresters in South Carolina and Florida. In South Carolina a small persistent nucleus of foresters who were convinced that registration and licensing were necessary for the upgrading of the profession, and who would not be discouraged, continued their efforts after defeat and disillusionment and now have obtained passage of their bill.

But the accolades for persistence must go to the Florida foresters, who have had a continuous program to get their bill passed by the Florida legislature since 1951. This kind of perseverance by the foresters in both states is what makes for great forestry, and hearkens back to the missionary attitudes of Hough, Fernow, and Pinchot. In so long as such an attitude of expression for the public's benefit and protection exists, the public need not fear for forestry in the United States.

Both the South Carolina and the Florida laws are permissive in character, allowing the qualified forester to be registered and licensed if he so desires, but not demanding that he do so. Thus, both states have followed the recommended procedure for introducing licensing legislation to the public regardless of the profession concerned. We must crawl before we walk, and we must have permissive legislation before we embark upon compulsory programs. Both laws, of course, prohibit the use of the title Registered Forester, without the user being licensed under the law.

A unique exemption in each of the laws indicates the necessity of compromise when dealing in legislative matters. In the South Carolina law it is stated: ". . . nothing herein shall be construed as preventing or prohibiting professional employees of public agricultural agencies from rendering forestry information, education, demonstration and conservation planning in line of duty; *provided* that such employees do not represent themselves to be professional foresters unless properly licensed or registered under the provisions of this act." In the Florida law it is stated: ". . . nothing in this act shall be construed as applying to any vocational class of forest workers, including, but not limited to, such classes as timber cruisers, timber markers, naval stores woods riders, vocational forestry teachers and agents, fire guards, lookouts, and employees of forest industry plants and logging operators." Use of a little imagination will bring to mind the kind of rather absurd road blocks that were thrown before the Florida bill over a period of ten years.

Both laws require the appointment of a five-man Board of Registration by the governor of the state from nominations presented to him by foresters. In Florida, the nominating group is the Florida Chapter of the Southeastern Section of the SAF; in South Carolina, it is the Foresters Council of South Carolina. In both

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states Board members will have staggered terms of office, and all members must be foresters. The usual safeguards against removal by the governor for political reasons, or against attempts to "stack" the Board exist in both laws. In neither state will Board members be entitled to compensation other than the usual per diem or travel allowances when attending to the business of the Board.

Qualifications for licensing are substantially the same in both laws, and follow the pattern set by previous forester registration and licensing laws in Georgia, Michigan, and Alabama. Persons may qualify under these categories: By reason of formal professional education and experience; by examination and experience; and by experience alone under the "grandfather clause." In South Carolina, the period of life of the "grandfather clause" is six months; in Florida it is two years.

The South Carolina law states that the annual registration fee shall not exceed $10; the Florida law sets the limit at $5. Thus, these two laws again reiterate the fact that registration and licensing of foresters need not be a costly process either to the individual, or as a state program.

Reciprocity clauses exist in both laws, thus permitting freedom of transfer of personnel from one state to another without an abundance of red tape. Violation of the law in both cases is a misdemeanor with the misdemeanor penalties applying thereto.

Foresters in the States of South Carolina and Florida are to be congratulated, not only for their perseverance, but for taking the big step forward to the raising of professional forestry standards and for their altruistic motives leading to the benefit and protection of the public. There is no doubt that other states will soon follow their example.

A. E. PATTERSON
*Chairman, Committee on Registration and Licensing of Foresters, SAF*

## SAF Communications and Publications

June 15, 1961

To: R. C. Winkworth, Chairman, Appalachian Section

FROM: Marlin H. Bruner, Vice-Chairman

The wide interest stimulated by the Committee on Society Communications, of which Donald E. Clark is chairman, is evidenced by recent reports and discussions of various members and officers of the Society. I particularly refer to those of Henry Clepper, Walter Ahearn, and also to the very excellent statement of the Gulf States Section at its meeting of May 8-9, 1961, Biloxi, Miss. All this has given us much to think about.

There is no argument regarding the need for better communications among the various segments of the Society. This is covered well in the Clark Committee report which suggests that more manpower and money are needed to accomplish the basic program in better communications. I'm all for this but there is a definite limit to which we can go here. Would the membership be willing to have its dues raised $3 or $5, or more, annually? Many would, but I fear that many membership drops would result—*unless*, the services of the Society to them would be increased accordingly—thus, the *money problem*.

Manpower poses a more complex problem especially as it pertains to the added chores imposed upon the officers and active committee members by this effort to close the communication's circuit. (*More people will pay for service than will serve.*) But if the circuit is to be closed the Section and Chapter officers, for example, will have to give much more of their time to Society affairs than they have ever done before. Would many of these officers, most of whom have responsible positions, be willing or *able* to devote the required time to such an effort? Unless an officer—Chairman of a Section, for example—is a fully de-

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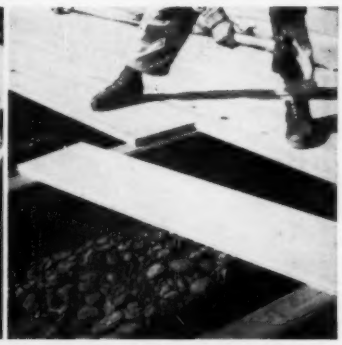

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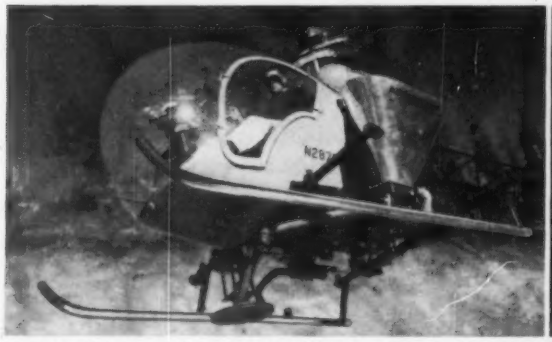

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voted member and has an extremely sympathetic boss, generally it would be impossible for him to accept the added responsibilities imposed. They will need help and, thus, the manpower problem will have to be solved by adding paid personnel to the Society staff. Money again!

This brings me to the fine report of the Gulf States Section mentioned before. I like, very much, their two-point program in dealing with two publications of the Society. This, of course, would also require additional manpower and money but I believe that their program would accomplish more per dollar and man-hour expended in closing the communications circuit than any suggestion that has been offered thus for. I believe that the Society membership would be willing to pay for this extra service.

## SAF Consulting Foresters Directory to be Published

Persons and firms listed in the SAF Consulting Foresters Directory published in the January 1961 JOURNAL OF FORESTRY have been requested by mail to approve, correct, or revise their listings for the new directory to be published in the January 1962 JOURNAL.

Members doing consulting forestry work and whose names have not previously appeared are invited to apply now for listing. They should provide complete information following the form used in the List of Consulting Foresters published in the January 1961 JOURNAL OF FORESTRY. Society membership is a prerequisite for listing. Such members must be in good standing, i. e., have paid their 1961 dues. Consulting firms will be listed if one or more of the partners or employees are members of the Society.

November 1, 1961 is the last date on which listings will be accepted for publication in the January 1962 directory.

## Virginia Appalachian Section Meeting

The Virginia summer meeting of the Appalachian Section was held on the evening of June 22 at Suffolk and on the morning of June 23 at Franklin, Va. The meeting was sponsored by the Southeastern Virginia Chapter, E. A. Friend, Jr., chairman, and approximately 80 foresters from Virginia, North Carolina, and South Carolina attended.

The evening meeting provided good fellowship and a fine beef barbecue dinner.

Because of heavy and persistent rains, the scheduled field trip to the Dismal Swamp was cancelled.

The talks and discussions held at Franklin, although entirely "inside," proved to be of real interest to those partieipating.

N. T. Barron, assistant manager of the Woodlands Division, Union Bag-Camp Paper Corp., gave the history of the company's purchase, logging, fires, and current development work.

J. E. McGowen, woodlands engineer, Union Bag-Camp, gave the history of the water control and access program in the Dismal Swamp. An item of particular interest was the portable aluminum bridge, constructed under the specifieations of Reynolds Metal Company, and used for crossing the canals. The bridge weighs 6,400 pounds, was designed to carry a load of 60,000 pounds, is 35 feet long and 9 feet wide.

George A. Gehrken, supervisor of wildlife conservation, Union Bag-Camp, outlined the history of hunting and game populations, eiting the low reproductive rate and current low food supply. Hunt clubs are allotted specific sections and are required to bush the road and ditch banks.

R. J. Bartholomew, distriet forester, Virginia Division of Forestry, detailed the history of fires and fire control in the Dismal Swamp. The inaccessibility, the presence of deep peat that burns to the water table, and the lack of water during critical fire periods tax the ingenuity and endurance of the fire fighter.

Sharon R. Miller, research forester, Union Bag-Camp, reviewed the organized research work begun in the Dismal Swamp in 1957. The work has included projects on chemical control of vegetation, measurement of water levels, methods of cutting immature red maple stands, and artificial regeneration of yellow-poplar and loblolly pine.

R. M. Osborn, superintendent of technical control, Union Bag-Camp, outlined the permanent plot system established in the Swamp to obtain volume and growth data. The functions of the Technical Control Department were described briefly.

## Southwestern Section Officers

Officers of the Southwestern Section, effective July 1, are as follows:

*Chairman*—Thomas J. Loring, U. S. Forest Service, Reserve, N. Mex.

*Chairman-elect*—Jay H. Cravens, P. O. Box 1490, Flagstaff, Ariz.

*Secretary-Treasurer*—Robert L. Diggs, 810 West Sherman, Williams, Ariz.

## More Than One Hundred Attend South Carolina Summer Meeting

More than a hundred persons participated in the 1961 South Carolina summer meeting of the Appalachian Section. Registration was held at the Pavilion at Myrtle Beach, S. C. The Pee Dee Chapter handled arrangements for the meeting.

Foresters had a choice of three tours

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which were run Friday afternoon, July 14, and Saturday morning, July 15. A shrimp and fish supper was served for the group Friday night at Myrtle Beach State Park.

The three tours were most informative.

*Tour No. 1.*—International Paper Company lands and operations between Myrtle Beach and Conway; mechanized pulpwood operations; prescribed burning for hazard reduction, seedbed preparation, and deer damage; planting and brush control areas; pond pine drainage; fertilization plots, and demonstration of front-mounted plow and Taylor Machine Works tree planting machine.

*Tour No. 2.*—Tour of wood-using industries at Conway: Stilley Plywood Corp., producing items for the furniture industry, water skis, and other items; Waccamaw Lumber Company, a modern sawmill operation; Red Hill Chip Corporation — producing pulpwood chips, and continuous charcoal production; E. E. Dargan Lumber Company, a hardwood operation producing furniture material.

*Tour No. 3.*—Work done by Consulting Foresters: direct seeding, planting, drainage, TSI work, land clearing, and general forest management.

An annual summer field meeting is held in each of the three states in the Appalachian Section (South Carolina, North Carolina, and Virginia), in addition to the winter business meeting which is held each year.

WALTER T. AHEARN

## Stuart Moir (1892-1961)

Stuart Moir, 69, of Oswego, Ore., died recently.

Born on May 20, 1892, in Boston, Mass., he obtained a B.Sc. degree in engineering at Massachusetts State College in 1913, and the M.F. degree from Yale in 1917.

Following graduation he was employed in white pine blister rust control, then in 1921 went with Laurentide Paper Company in Canada. Four years later he became southern manager for Fairchild Aerial Surveys. Subsequently he became chief forester for the Western Pine Association, and for ten years was forest counsel for the Western Forestry and Conservation Association, retiring in 1958.

He had been a SAF member for 40 years, first joining in 1921.

## Membership Applications and Advancements

Proposals for admission, advancement, and reinstatement received in the Society office during the month of July are listed below.

Action on the eligibility of those proposed for membership as listed below will be taken by the Council as of September 30, 1961.

Communications from the voting members regarding the membership eligibility of these persons should be received in the Society office prior to that date.

### Allegheny Section

*Student Grade*

PENNSYLVANIA STATE UNIVERSITY

Brubaker, D. P.

*Junior Grade*

Hornbeck, J. W., Asst. in Research, Pa. State Univ., University Park, Pa. Pa. State, BSF, 1960.

Pierson, G. H., Asst. Forester, N. J. Dept. of Cons. and Economic Development, Pleasantville, N. J. N. C. State, BSF, 1955.

*Students Eligible for Automatic Advancement*

WEST VIRGINIA UNIVERSITY

| | |
|---|---|
| Ayton, J. S. | Jones, L. T. |
| Bailey, F. E. | Lantz, R. L. |
| Barnes, J. R. | Lewis, L. N. |
| Brittain, R. E. | Mollish, A. P. |
| Brooks, R. G. | Rexrode, C. O. |
| Clendening, G. F. | Riley, J. W. |
| Cromer, J. I. | Roth, E. E. |
| Frame, E. D. | Simon, J. F. |
| Gillespie, J. L. | Smith, R. C. |
| Grafton, W. N. | Trammell, C. T. |
| Hauck, W. R. | Wilson, A. D. |
| Zaebst, O. C. | |

*Member Grade*

Smoot, R. O., Forester, USFS, Upper Darby, Pa. (Reinstatement).

### Appalachian Section

*Junior Grade*

Rigouard, E. F., Research Forester, S. E. Forest Expt. Sta., Asheville, N. C. N. C. State, BS, 1956.

Robinson, V. L., Research Forester, S. E. Forest Expt. Sta., Asheville, N. C. Iowa State, BSF, 1956, MS, 1958.

Thrash, T. L., Forester, USFS, Asheville, N. C. (Reinstatement).

*Member Grade*

Anderson, H. J., Dept. of Cons. and Development, Raleigh, N. C. (Junior 1954).

### Columbia River Section

*Junior Grade*

*Students Eligible for Automatic Advancement*

OREGON STATE UNIVERSITY

| | |
|---|---|
| Brandt, B. L. | Cron, R. M. |
| Brassfield, R. S. | Hedgpeth, G. C. |
| Thayer, H. A. | |


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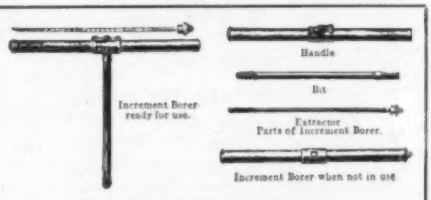


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| 6 in. | 4332½ | 21.10 | 4332½ B | 4332½ E |
| 8 in. | 4333½ | 24.25 | 4333½ B | 4333½ E |
| 10 in. | 4334½ | 27.35 | 4334½ B | 4334½ E |
| 11¾ in. | 4335½ | 30.65 | 4335½ B | 4335½ E |
| 13¾ in. | 4336½ | 34.00 | 4336½ B | 4336½ E |
| 15¾ in. | 4337½ | 36.60 | 4337½ B | 4337½ E |

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*Affiliate Grade*

Green, R. A., Asst. Forester, Assessor's Office, Kelso, Wash.

**Gulf States Section**

*Junior Grade*

Haarala, G. R., Project Forester, Kirby Lumber Corp., Silsbee, Texas. La. State, BSF, 1958.

**Inland Empire Section**

*Junior Grade*

Hall, A. C., Consultant Forester, Coeur d'Alene, Idaho. Univ. Idaho, BSF, 1951.

Olson, R. J., Forester, Soil Cons. Service, Spokane, Wash. (Af52R59).

**Intermountain Section**

*Junior Grade*

Ladle, J. W., Staff Asst. USFS, Salmon, Idaho. Univ. Idaho, BSF, 1937.

*Member Grade*

Hubbard, A. C., Forester, Brown's Tie and Lumber Co., McCall, Idaho (52-R55).

**New York Section**

*Junior Grade*

Grayson, F. L., Assoc. Economist, American Paper and Pulp Assoc., New York, N. Y. (Reinstatement).

Wheeler, S. A., County Forester, County of Otsego, Cooperstown, N. Y. (Affiliate 1955).

*Students Eligible for Automatic Advancement*

STATE UNIVERSITY COLLEGE OF FORESTRY AT SYRACUSE UNIVERSITY

Domeree, R. L. Palmer, J. D.

**Northern California Section**

*Junior Grade*

Brichacek, O. J., Forester, USFS, Yreka, Calif. (Reinstatement).

*Students Eligible for Automatic Advancement*

UNIVERSITY OF CALIFORNIA

Boiteux-Buchanan, J. Fowler, G. W.

**Ozark Section**

*Affiliate Grade*

Alexander, W. R., Forester, Brunswick Pulp and Paper Co., Brunswick, Ga.

Cook, E. W., 1101 East 32nd, Texarkana, Ark.

Hildebrand, D., 903 Tenth Street, Perry, Okla.

James, B. D., 1713 Keaton Street, Jacksonville, Ark.

Morphew, J. E., Route 1, Box 100, Glenwood, Ark.

Tatum, J. C., Consultant Forester, Southern Timber Co., Camden, Ark.

**Puget Sound Section**

*Junior Grade*

Undi, N. J., Ass't. D. A. Forest Mgmt., Dept. of Natural Resources, Forks, Wash. (Affiliate 1958).

**Southeastern Section**

*Student Grade*

UNIVERSITY OF GEORGIA

Alexander, R. E. Cope, L. E.
Atkinson, J. D. Kenimer, D. B.
Beasley, J. L. Waldrop, R. K.

*Junior Grade*

Roberts, M. N., Forest Mgr., Ga. Kraft Co., Greensboro, Ga. (Reinstatement).

**Upper Mississippi Valley Section**

*Student Grade*

UNIVERSITY OF MINNESOTA

Olson, V. G.

*Junior Grade*

Roles, J. P., Ass't. Dist. Ranger, USFS, Marcell, Minn. (Reinstatement).

*Students Eligible for Automatic Advancement*

IOWA STATE UNIVERSITY

Gutcher, D. C.

*Affiliate Grade*

Kotila, P. E., General Mgr., Tomahawk Timber Co., Ely, Minn. (Reinstatement).

*Associate Grade*

Stearns, F. W., Project Leader, Lake States Forest Expt. Sta., St. Paul, Minn.

**Wisconsin-Michigan Section**

*Junior Grade*

*Students Eligible for Automatic Advancement*

UNIVERSITY OF MICHIGAN

Shepherd, R. W. Stienon, J. P.

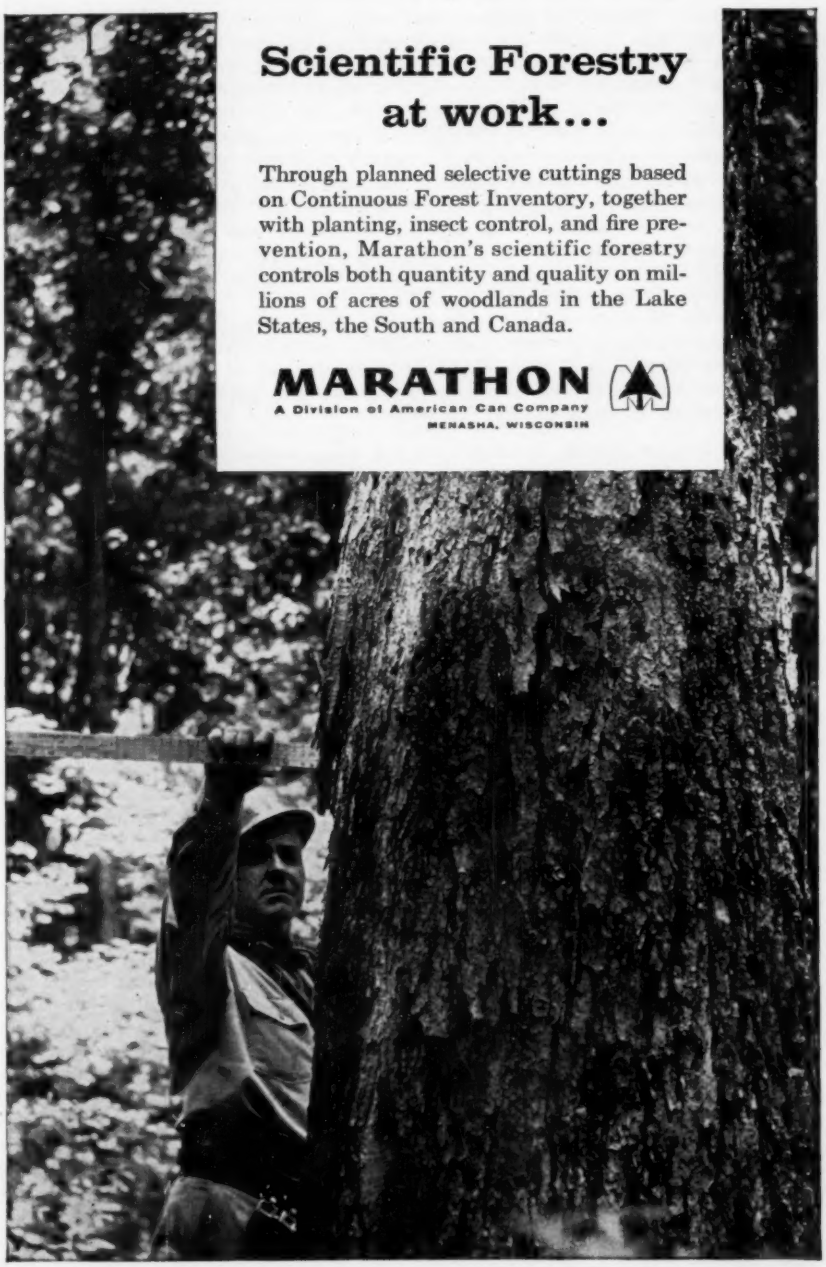
*Member Grade*

Mossholder, R. E., Vice President, Forestry Associates, Inc., Hart, Mich. Mich. State, BSF, 1951 (Junior 1956).

**No Section**

*Junior Grade*

Rea, P. L., Lab. Tech., U. S. Army, Fort Knox, Ky.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# National Outlook

**Looking Ahead.** Joseph L. Fisher, president of Resources for the Future, Inc., recently gave some estimates of the size and shape of the U. S. economy twenty and forty years ahead. An RFF group, making projections of economic magnitudes into the future, sees the gross national product (total value of end products and services) at double the 1960 figure by 1980 and doubled again by the year 2000. In 1960, the gross national product was $503 billion. The projections show $1,060 billion in 1980 and $2,200 billion by 2000. Population may increase from 180 million in 1960 to 245 million in 1980 and 330 million in 2000. The estimates show government expenditures increasing from $100 billion to $230 billion and $520 billion in the same period; private investment from $73 billion to $160 billion and $340 billion.

In these estimates it is assumed, of course, that past trends will more or less continue, that no major war or other catastrophe occurs, and that a reasonably high level of economic activity will be maintained.

On the basis of these projections that suggest the general dimensions of future needs, the RFF group is developing projections of the demand for materials such as steel and lumber, and of the requirements for and potential supplies of basic natural resources.

**Lumber Output.** Whatever the long-term prospects, demand for lumber in the early months of this year was not so good. According to the Secretary of Commerce's Lumber Survey Committee, estimated national consumption of lumber, in the first quarter of 1961, was eight percent below the corresponding quarter of 1960. The committee anticipated that for the first half of 1961, consumption would run six percent below last year. Included in the estimated consumption for the first quarter of 1961 were 6,623 million feet of softwood lumber, a decrease of six percent from the first quarter of 1960; and 1,283 million feet of hardwoods, off 19 percent.

National production of lumber during this year's first quarter, totaling 7,261 million board feet, decreased 17 percent from the corresponding quarter of last year. Shipments of lumber in the 1961 quarter were two percent above production. New orders exceeded the output by ten percent. New orders in March showed a whopping big gain of 52 percent over February.

**World Production.** Worldwide, 1960 was a record year for production, trade, and consumption of forest products. According to a commodity review prepared by the Food and Agriculture Organization of the United Nations, world production of roundwood showed a six percent increase over the preceding year. A similar increase occurred in 1959. The 1960 gain came mainly from increased fellings in Europe and the Soviet Union. For the first time, production of softwood lumber in the U.S.S.R. outstripped that of North America. In production of paper and paperboard, North America accounted for more than half of the world total. World production and consumption, which rose by 6.2 million metric tons in 1959, showed a smaller gain (2.9 million tons) in 1960. All regions except Africa shared in the increase.

FAO's Economics Department said it was by no means certain that 1960 records would be surpassed in the current year. But favorable signs for continuing growth were not lacking.

**Wood Promotion.** Full-color ads in *Life,* wood clinics, numerous booklets, and field contacts feature the National Wood Promotion Program conducted through the National Lumber Manufacturers Association.

Clinics on wood school construction have been held in a number of cities for school officials, architects, fire chiefs, lumbermen, and others. New technical publications planned during the year included a manual on component construction, an industrial design handbook, technical reports on fire resistance ratings, and design for hurricane resistance.

The two-year-old National Wood Promotion Program has a budget of over $2 million for 1962. For the stepped-up program, NLMA's 16 federated associations accepted a dues increase from 10 cents to 16 cents per thousand board feet of production.

**Congressional Actions.** A bill introduced in Congress has a long and often difficult path to follow before it is enacted into law. First, it is referred to an appropriate committee, which considers and reports on it, perhaps after holding hearings. Some bills die for lack of committee action. If the bill is favorably reported, it has to be placed on the legislative calendar by the leadership before it can be debated on the floor. The same procedure is followed both in the House and Senate. If the terms of a measure passed by one of these bodies differ from those passed by the other, conferees are appointed to iron out the differences. The conference-approved version must go back to House and Senate for final passage before it is sent to the President for his approval.

Under such involved procedure, determined opposition can slow down or halt the progress of a bill at many points. Some of the President's recommendations for new legislation didn't get very far during the first session of the 87th Congress. A number of items, however, have been enacted into law. Some of these affect forest industry or forestry programs, directly or indirectly.

One key measure in the President's legislative program authorized $400,000,000 in federal funds to assist local communities in economically depressed areas. The program is being administered by the Department of Commerce.

A housing act will provide several billion dollars in federal authorizations and grants for urban renewal and housing loan programs. The act also authorizes grants to state and local governments to acquire lands for parks and recreational areas.

Congressional action has extended the 52 percent corporate income tax and other excise taxes for one year. Another bill passed by Congress continues the President's authority to submit government reorganization plans, which will become law unless disapproved by the House or Senate within 60 days after submission.

Senate and House conferees settled differences in the water pollution bill as passed by the two Houses. The bill enlarges the program of federal grants to help communities clean up the nation's rivers.

Bills not enacted during this year's session will carry

over into the second session of the 87th Congress next year. A number of bills concerned with natural resources are among the still pending measures that may see action in 1962.

**Tax Idea.** A one-cent tax on soft drinks or cigarettes has been suggested by Interior Secretary Steward L. Udall as a possible way of financing a greatly expanded outdoor recreation program. In an interview with newsmen, he said the next ten years will be the nation's last chance to save millions of acres needed for recreation and wildlife areas. Other financing possibilities he suggested were: fees paid by recreation area users; taxes on manufacturers who benefit from these areas; a $2 billion bond issue, to be retired by special taxes or fees.

**Pilot Studies.** For the national forests, the newly established Advisory Committee on Multiple Use does not favor over-all entrance fees or charges, but has recommended pilot studies on charges for certain recreational uses.

**Oil Industry Policy.** The American Petroleum Institute recently adopted a statement of policy for the industry on conservation of natural resources. The statement recognizes conservation and wise use of resources as essential to America's well-being. It subscribes to effective soil, forest, and grassland conservation programs; advocates full cooperation among industry, government, and private conservation organizations; supports the concept of multiple use of public lands. The Institute endorses the principle that producers of contaminating wastes have a social responsibility to avoid the pollution of waters.

The statement advocates that large withdrawals or restrictions of public lands for public use should be made only by Act of Congress after full and open hearings. On wilderness legislation, it recommends that action be deferred until the National Outdoor Recreational Resources Review Commission's report is completed; and it urges that any such legislation include provisions for factual determination of resource values and their relative priorities for areas included in a wilderness system. Future wilderness areas, the Institute says, should be established only by action of Congress.

**"Smokey Museum."** The town of Capitan, N. Mex., is trying to raise funds to develop and maintain its Smokey Bear Museum in the interest of forest fire prevention. "Smokey," a burned and badly frightened cub, was found near Capitan during a forest fire in 1950. Presented to the U. S. Forest Service, he now lives in the National Zoological Park in Washington, D. C.

**Land Exchanges.** Applications for exchange of national forest land, or of timber for land, will be handled by the U. S. Forest Service instead of by the Bureau of Land Management, under a proposed revision of the Code of Federal Regulations. The revision brings the rules into conformity with legislation enacted last year, under which certain functions relating to national forest land exchanges were transferred from Interior to the Agriculture Department.

**Timber Price Reporting.** As finally passed, the 1962 Agriculture appropriations bill did not provide for a timber price reporting service in the Department of Agriculture, although an amendment to this effect had been sponsored by Senator Hubert H. Humphrey of Minnesota. The bill did, however, contain provisions that make $15,000 available to the Department's Statistical Reporting Service for the purpose of conducting a study and reporting upon the feasibility of such price reporting.

**Anti-Litter Campaign.** The Advertising Council, Inc., which has cooperated for many years with the U. S. Forest Service and state forestry departments in conducting the highly successful Smokey Bear forest fire prevention campaign, this year begins a campaign against throwing litter and trash along the roadside, in recreation areas, and other public places. The campaign will be conducted in cooperation with Keep America Beautiful, Inc., the national public organization for the prevention of litter. This year's campaign motto: "Every litter bit hurts." A new Walt Disney animated cartoon movie, "The Litter Bug," will be widely shown in connection with the campaign.

**Quake Area.** The Madison Canyon earthquake slide area in Gallatin National Forest, Montana, is a growing tourist attraction. This year the Forest Service had in place a well-planned system of explanatory signs. Road construction and other improvements in the area were well advanced. An estimated 360,000 persons from all fifty states and many foreign countries visited the area last year, although some of the access roads into the area had not then been completed. This year the Forest Service expected a substantial increase in visitors.

**For Watershed Stability.** Members of Utah's congressional delegations, although often disagreeing on other things, are solidly behind a bill to place some 24,000 acres of eroding private watershed land in the Wasatch National Forest. The critical area, near the head of Weber Canyon, mostly in Morgan County, Utah, would thus be brought under a U. S. Forest Service watershed rehabilitation program to reduce flood danger, check erosion, and safeguard the Weber Basin Reclamation project, now more than half completed. A damaging flash flood occurred in the area four years ago. The program is a cooperative one among the commissions of Morgan, Davis, and Weber Counties, the Weber Basin Water Conservancy District, and the Forest Service.

**Education of African Students.** A coordinated program for the education of African students in the United States has been announced. Three groups of American colleges and universities are participating—The African-American Institute, the United Negro Colleges Fund, and the African Scholarship Program of American Universities, the last named a cooperative project in international education. The program is still in an exploratory stage as regards forestry, wildlife management, watershed management, and related fields of natural resources management. Financial assistance and scholarships are being sought for qualified students in natural resources.

At the session of the Council of FAO held in Rome in June among the topics discussed was a proposal for a special program of education and training in Africa. This program is expected to be outlined in detail by the director general of FAO at its conference in Rome in November. It is likely that education in forestry and natural resources will be included.

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# Letters

### Approves New Section

Congratulations on the new section in the JOURNAL OF FORESTRY which you have entitled "National Outlook." This section outlines some of the major conservation and forestry items that should be of national interest to all of us forester readers. It does it in a concise manner which I am sure will be appreciated and will keep all of us better informed on the current problems in which we should be interested.

M. M. NELSON
*Milwaukee, Wis.*

### Reactivate "PR" Division?

I would like to suggest that the Society of American Foresters give serious consideration to reactivating the Public Relations Division at the earliest opportunity.

Why do we need a "PR" division in the SAF?

1. Unlike the manager of an industrial plant who can construct a six-foot woven wire fence around the property, the forester cannot lock the public out of the woods. To succeed in his protection and management objectives the forester must have public support and understanding. This requires *sustained public relations.*

2. Foresters can be proud of their public relations accomplishments of the past 50 years. But times are changing and what was good enough only 10 years ago is inadequate today. The "PR" task, like everything else, is becoming bigger and more complex. Forestry, with a relatively small body of professional men, is striving to reach millions of people with its story. We will have a better chance of doing this if the scope of our "PR" activities *grows* with the size of the protection and management job we are seeking to do.

3. The competition of nonforestry uses for the relatively fixed area of forest lands that foresters protect and manage is rapidly gaining momentum. The concept of multiple use, for example, has already seen the battleground and will undoubtedly see it again. The pressures on the forest land manager are snowballing. We can no longer afford to go nonchalantly about our business until a misguided public opinion bulldozer crushes or maims us. We need to anticipate and lead. Carefully executed, *"preventive public relations"* can become one of the forester's best protection and management tools.

If we agree that "PR" is a vital element in our profession, why not recognize this fact by giving public relations full Division status in the Society of American Foresters—as it had for several years after 1948? This should provide America's foresters with a central platform on which to air mutual "PR" problems, exchange experiences, and help each other in this important field which, in addition to the day-to-day "PR," so frequently requires a united effort on the shortest notice. A Public Relations Division should also help secure an equitable place for "PR" on the program at the national annual meetings of the SAF, as well as in the Section and Chapter conferences.

As a final thought, it is worth noting that the early organizers of the SAF were "PR"-conscious. Article II of the Washington Section bylaws, which is still in force, includes the objective: *". . . to promote the science, practice and standards of forestry in America. . . ."*

GEORGE VITAS
*Washington, D. C.*

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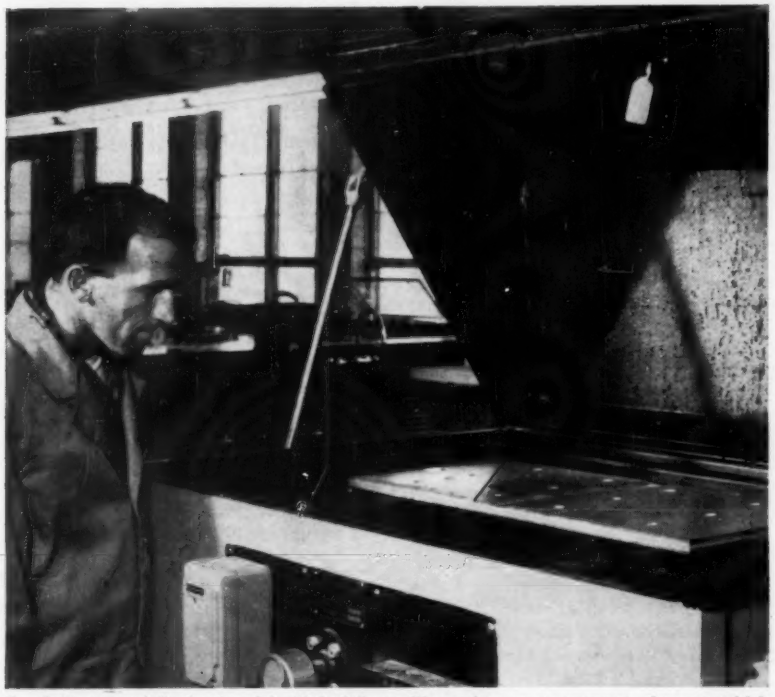

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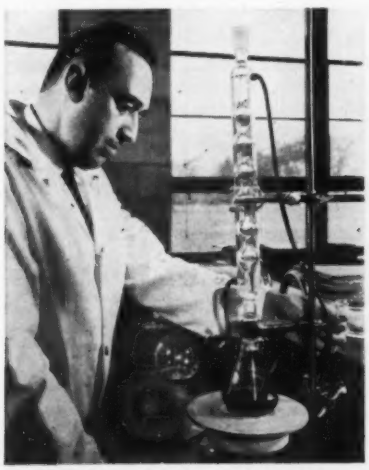

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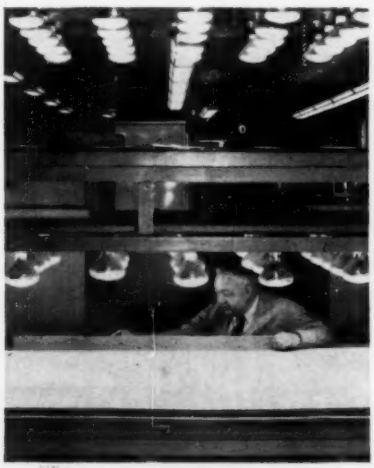

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# Forestry News

## AFPI Sponsors Forest Land Use Conference

A Forest Land Use Conference to consider the growing role of forest lands in serving the economic, social, and spiritual needs of the nation's soaring population will be held in Washington, D. C., September 21-22.

American Forest Products Industries, Inc., conference sponsor, said experts from industry, government, labor, and conservation groups will discuss various aspects of the subject in the two-day meeting at the Shoreham Hotel.

Bernard L. Orell, vice president of Weyerhaeuser Company and a member of the Outdoor Recreation Resources Review Commission, will be conference moderator. John H. Hinman, honorary chairman of the board of International Paper Company and president of AFPI, will deliver the address of welcome.

George A. Garratt, dean of the Yale School of Forestry, will be keynote speaker.

Use of government lands will be discussed by a panel composed of Dr. Richard E. McArdle, chief, U. S. Forest Service; Conrad Wirth, director, National Park Service; Dr. Wilson M. Compton, director, The American Forestry Association; Ralph Wible, Pennsylvania state forester; Mrs. J. Campbell Palmer III, chairman, Civic Development Committee of State Garden Clubs, Inc.; Howard Zahniser, executive secretary, The Wilderness Society; Hardin R. Glascock, Jr., forest counsel, Western Forestry and Conservation Association.

The place of large private and industrial holdings in the forest land use picture will be discussed by a panel composed of O. G. Traczewitz, chief forester, Southern Kraft Division, International Paper Co.; Edward P. Cliff, assistant chief, U. S. Forest Service; Thomas L. Kimball, executive director, National Wildlife Federation; Paul L. Phillips, president of United Papermakers and Paperworkers, AFL-CIO; Joseph L. Fisher, president, Resources for the Future, Inc.; Curtis Hutchins, chairman of the board, Dead River Company.

Use of small private forest holdings will be discussed by the following panelists: James G. Yoho, professor of forest economics, Duke University School of Forestry; John I. Taylor, assistant legislative director, American Farm Bureau Federation; Arthur M. Sowder, extension forester, Agricultural Extension Service; Joesph W. Penfold, conservation director, Izaak Walton League of America; Arthur J. Schwaiger, Michigan tree farmer; T. B. Plair, head woodland conservationist, Soil Conservation Service; George W. Dean, Virginia state forester.

The conference will close with a summary and analysis by Samuel T. Dana, dean emeritus, University of Michigan School of Natural Resources.

## Key Deer National Wildlife Refuge Increased

All of Howe Key in southern Florida now is in the Key Deer National Wildlife Refuge after the donation of the last 167 acres of private land on the island to the federal government by the North American Wildlife Foundation.

Congress authorized the refuge in 1957 in order that essential habitat could be obtained for preservation of the tiny Key deer, smallest of all species in North America. Only 32 of these small deer were known to be in existence ten years ago, and the herd has increased to about 200 following special protection.

While primarily for the Key deer, the refuge also will benefit birds, other animals, and unusual plants of that subtropical environment.

## National Forest Products Week

Chairmen for 39 states to direct the planning for National Forests Products Week and year-round promotion have been announced by E. W. Hammerschmidt, chairman of the board, International Concatenated Order of Hoo-Hoo, fraternal order of lumbermen.

NFPW is October 15-21 this year, the third week in October, by Joint Resolution of Congress. In Canada, only Manitoba of the 10 provinces, does not yet have a chairman. Hammerschmidt said additional state chairmen will be appointed.

"National Forest Products Week should be as a springboard for a sustained promotion throughout the year," he said, "and not as just a splash in the pond to be forgotten until next year."

He invited the cooperation of all individuals, companies, associations, and

government agencies whose economic strength is based on wood products.

## Private & Industrial

### Allen Heads Weyerhaeuser Forestry Research

Dr. George S. Allen, dean of the University of British Columbia's Faculty of Forestry, has been selected to head Weyerhaeuser Company's forestry research program, it has been announced by Edwin F. Heacox, vice president, Timberland Division.

As director of forestry research, Dr. Allen's responsibilities will include the former duties of William H. Cummings, who has resigned as supervisor of the company's forestry research center.

Dr. Allen holds degrees from the University of British Columbia and the University of California. Prior to joining the University, he was a member of the forestry research staff of the British Columbia Forest Service. He has served as dean of the forestry school with responsibilities for forestry research at the University since 1953. Dr. Allen has written a large number of scientific papers in the field of forestry.

With headquarters in Centralia, Wash., Dr. Allen will direct the 22-man staff of Weyerhaeuser's forestry research laboratories as well as the forestry research program on the company's tree farms. Weyerhaeuser's forestry research covers a broad field in the natural sciences. It includes basic studies in forest soils, physiology, genetics, entomology, pathology, and biology. Investigations are carried on in several phases of silviculture, reforestation, and protection.

### Florida Forester Joins Owens-Illinois

Bernard J. Dowling, active in Florida forestry for more than 10 years, has joined the Owens-Illinois Southern Woodlands Division at Jacksonville, Fla., as operations control engineer, J. W. Haley, O-I woodlands general manager, has announced.

Dowling, a native of Perry, Fla., has worked in the Foley area since graduation from the University of Florida in 1950. With Owens-Illinois, he will be responsible for the company's woodlands supervisory performance plan and evaluation of new methods and procedures.

Owens-Illinois owns timberland in Florida and Georgia and operates containerboard mills in Jacksonville, Fla., and Valdosta, Ga.

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### C of C Resources Chairman

Reappointment of David L. Francis, president of Princess Coals, Inc., Huntington, West Virginia, as chairman of the Natural Resources Committee, Chamber of Commerce of the United States, has been announced by Chamber President Richard Wagner. Mr. Francis is also a vice president of the Chamber.

With representation from all parts of the country, the 52-member Committee advises the Board of Directors on issues affecting coal, electric power, federal land management and grazing, forest products, oil and gas, mining, recreation, and water resources.

The Committee will meet in Boise, Idaho, September 14-16, 1961, and in Washington, D. C., February 5-7, 1962.

### R. B. Holder Joins AFPI

Robert B. Holder of Knoxville, Tenn., has been appointed director of administrative services for American Forest Products Industries. He will be in charge of the association's forest industry relations.

Holder came to AFPI from the Champion Paper and Fibre Co. of Canton, N. C. He was area supervisor of wood procurement and conservation forestry in Tennessee for Champion, with headquarters at Knoxville. A native of Atlanta, he is a forestry graduate of the University of Georgia. He was with the Army during four years of World War II.

Before joining the Champion staff, he had served as farm forester for the Tennessee Division of Forestry in Greeneville, Tenn., and as forester for the Draper Corporation in Asheville, N. C.

NAMED TO STATE TAX COMMISSION. Paul F. Liniger, a professional forester, was recently appointed by Oregon Governor Hatfield as one of the three members of the Oregon State Tax Commission. Liniger has been forest taxation specialist for the Industrial Forestry Association, Portland, since 1954. He is a 1939 graduate of the University of Washington College of Forestry and his experience includes several years with the U. S. Forest Service, with a consulting firm, and several forest industry companies.

### Industry Planting in the South

The Southern Pulpwood Conservation Association has recently reported upon the industry's planting program during the 1960-1961 season. A total of 386,427,621 forest tree seedlings on some 483,000 acres in the 11 southern states were planted and another 4,859 acres were direct-seeded. The total includes company lands, the lands of pulpwood suppliers and individual properties. About 62 percent of the trees came from 19 industry-operated nurseries in the South.

### Helmuth Bay Retired from Rand McNally Company

Helmuth Bay, Washington, D. C., representative of Rand McNally Company and former editor of all Rand McNally atlases, was retired June 30 after 38 years of service. He was tendered a testimonial luncheon in the National Press Club by 65 friends and colleagues.

A member of the Society of American Foresters since 1932, Mr. Bay studied forestry at Wyman's School of the Woods, Munising, Mich., and at Montana State University.

For a number of years he was a research associate in forestry and forest resources at the Museum of Science and Industry, Chicago.

Since 1946 he has been chairman of the SAF Committee on Foresters' Photographs (the Pinchot Collection) in the Library of Congress.

FACTORY . . .
not a
WAREHOUSE

We might call this a "stand" of timber . . . but there's nothing so static about the southern forest. It's a great, green giant that makes up 40% of the nation's woodlands and produces 60% of its pulpwood.

The fast-growing forests of the South are the basis for that area's great pulp and paper industry. Under the leadership of firms such as Gulf States Paper they will continue to be busy forest factories, not merely stands waiting for the woodsman's saw.

GULF STATES PAPER
TUSCALOOSA, ALABAMA

## Public

### Holman Succeeds Marlin as Mississippi State Forester

C. B. Marlin resigned as state forester of Mississippi effective July 31, 1961, to join the staff of the Louisiana State University School of Forestry where he will teach and conduct research.

Marlin, a graduate of Mississippi State University in agriculture economics and holder of a Master of Forestry degree from Duke University, has served the Forestry Commission

in four different capacities covering a 10-year period. He has been state forester for the past five years. Before accepting employment with the Forestry Commission in 1951 he taught forestry and conducted research at Mississippi State University.

Marlin was the current chairman of the "Smokey Bear" Committee of the Association of State Foresters; vice-chairman of the Mississippi State Agricultural Coordinating Council and a member of the State Soil Conservation Committee, Forestry Development Board of Trustees, and Board of Directors of the Mississippi Forestry Association. He has served as chairman, Southern Group of State Foresters; secretary and vice chairman of the Forestry Section of the Association of Southern Agricultural Workers; Secretary of Mississippi Chapter, Society of American Foresters, and State Agricultural Coordinating Council.

Marlin has been succeeded by Jack Holman of Morton, Miss. At the time of Holman's appointment, July 19, he was vice president of the Richton Tie and Timber Co. He holds a degree from Arkansas State College in education, from Louisiana State University in forestry, and a Master in Forestry from Duke University.

## Pacific NW Deputy Regional Forester Named

A new position of deputy regional forester was established in the Pacific Northwest Region of the U. S. Forest Service, Portland, Ore., on July 9, J. Herbert Stone, regional forester, has announced.

This is one of two such positions approved by the Secretary of Agriculture. The other position is in the North Central Region, with headquarters at Milwaukee, Wis.

Alfred E. Spaulding will be promoted to the new position, Stone announced. Spaulding was assistant regional forester in charge of the Division of Fire Control. Before going to Portland he was chief of fire control for the Northern Region at Missoula, Mont. A 1932 graduate of the University of Montana School of Forestry, Spaulding served successively with the Northern Rocky Mountain Forest and Range Experiment Station, as a forest ranger on the Kaniksu National Forest in Idaho, as assistant supervisor of the same forest, and supervisor of the Colville National Forest of northeastern Washington. The Missoula Aerial Fire Depot was developed while he was fire control chief of the Northern Region.

Kenneth O. Wilson, a 1937 graduate of Oregon State University, succeeds

ALFRED E. SPAULDING

Spaulding as fire control chief. He was previously assistant to the Director of Fire Control in the chief's office in Washington, D. C.

## C. D. Dosker Named to U. S. Agricultural Commission

C. D. Dosker of Louisville, Ky., has been appointed to the National Agricultural Advisory Commission. The Commission, constituted in July with a briefing by President Kennedy, has 25 members.

Mr. Dosker is the only member from the forest products industry and with a background in forestry. He is president of Gamble Brothers, Louisville, and an Associate Member of the Society of American Foresters. For many years he has been active in developing better forestry and forest utilization on farm woodlands and small forest ownerships.

The Commission will advise the Secretary of Agriculture on policy.

## Intermountain Division Chief Appointed

Harold S. Coons, auditor in charge of the Western Internal Audit Unit with the U. S. Forest Service in Portland, Ore., became chief of the Division of Fire Control and State and Private Forestry in the Ogden regional office July 31, it has been announced by Floyd Iverson, regional forester.

Coons, a native of Iowa, graduated in forestry from Iowa State University and launched his Forest Service career in Wisconsin in 1934 as a technical foreman in the CCC. From 1939 to 1941 he was assigned to timber management activities on national forests in California, progressing from

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assistant ranger to ranger and assistant supervisor. In 1951 he was promoted to supervisor of the Wallowa-Whitman National Forest in Oregon. He obtained the management analysis post in 1958.

### I&E Personnel SW Region

Regional Forester Fred H. Kennedy has announced the establishment of a new Division of Information and Education in the U. S. Forest Service's Southwestern Regional Office at Albuquerque, N. Mex. J. Morgan Smith has been named assistant regional forester in charge.

Before joining the Southwestern Regional staff in 1958, Smith served as assistant chief of Information and Education in the Eastern Region and spent nine years in Washington as assistant director of the Smokey Bear Program. Prior to these assignments he worked in the Rocky Mountain Region for 14 years on various national forests in Colorado, Oklahoma, and Wyoming. Smith is a 1930 graduate of Syracuse University and has also done graduate work at Harvard and Oregon State.

Mr. Kennedy also announced the selection and promotion of Raymond M. Housley, Jr. to the position of assistant chief, Division of Information and Education. Housley, who has been in charge of Range, Watershed and Wildlife on the Coconino National Forest, Arizona, started work on this some forest as a seasonal laborer in 1944. He served in the Army in 1946 and 1947 and graduated from Colorado State University in 1952.

### Economist on Philippine Assignment

E. V. Roberts of the Intermountain Forest and Range Experiment Station, Ogden, Utah, was in July making final preparations for an assignment in the Philippine Islands according to announcement by Station Director Reed W. Bailey. Roberts has been chief of the station's Division of Forest Economics Research for the past four years. He held a similar post for seven years at the Pacific Southwest Forest and Range Experiment station at Berkeley, Calif., prior to transfer to Ogden in 1957.

In his new position as forestry adviser, Mr. Roberts will direct the forest survey of the Philippine Islands under joint sponsorship by the Philippine Bureau of Forestry and the International Cooperation Administration. He has completed 35 years work with the U. S. Forest Service and has had many years experience in directing forest surveys in the central, southern.

and western states.

In 1931-1932 Roberts was insular forester for the American Virgin Islands and developed a forestry program for the territory. In World War II he was commander of an engineering forestry company in the Corps of Engineers operating sawmills in Burma that cut timbers for bridges on the famous Ledo Road.

Mr. Roberts is a native of Pennsylvania and a graduate of the Pennsylvania State University; he holds a Master degree in forestry from Yale University.

### Paddock Retirement Announced

The retirement of William R. Paddock, forest supervisor of the Chequamegon National Forest, Wisconsin, on July 31 has been announced by M. M. Nelson, regional forester, North Central Region, U. S. Forest Service, Milwaukee. Mr. Paddock has been forest supervisor of the Chequamegon for the last six years. His retirement marks the completion of 34 years service with the U. S. Forest Service.

Paddock, a native of Michigan, is a 1927 forestry graduate of Michigan State University. He began his Forest Service career in 1927. His first assignment was in the Southeast, where he worked on the Nantahala and Quachita National Forests until 1933, when he was appointed forest supervisor of the Quachita Forest. Since then he has served in the regional office in Atlanta, as forest supervisor of the Kisatchie and Cherokee National Forests, and on the Timber Production War Project in Alexandria, La., prior to his assignment as forest supervisor in Park Falls, Wis.

### Fremont Supervisor to Washington, Successor Named

Transfer of Clayton N. Weaver, supervisor of the Fremont National Forest, to Washington, D. C., headquarters of the U. S. Forest Service, and selection of Carl W. Simpson as new forest supervisor were announced in June by J. Herbert Stone, regional forester.

Weaver becomes chief of the Branch of Organization and Work Programs, Division of Administrative Management, in the Washington office. At the same time, Simpson will take charge of the Fremont Forest, with headquarters at Lakeview. He was previously in charge of range analysis in the Division of Range and Wildlife Management in the regional office, Portland.

A 1938 graduate of Oregon State University, Weaver began Forest Service work on the Rogue River National Forest while a student. He later worked in the Rocky Mountain and California Regions before being named

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supervisor of the Fremont National Forest in October 1957.

Simpson holds a degree in forestry and range management from Montana State University (1941). He worked summers for the Forest Service while in college, serving as acting district ranger in 1941. He was put on a special wartime project in the Southwest and then returned to the Northern Region in 1943 as a district ranger. He was for six years staff officer on the Beaverhead National Forest. He transferred to Portland in 1958.

Simpson is a charter member of the American Society of Range Management and is presently treasurer of the Society's Pacific Northwest Section.

### Regional Wildlife Chief Named

The assignment in the Denver Regional Office of the Forest Service of A.F.C. Greene to the position of chief, Wildlife Management Branch in the Division of Range and Wildlife Management, was announced, effective in June.

He replaces Ralph R. Hill who has been transferred to the Washington office of the Forest Service as assistant chief of the Wildlife Management Branch.

Greene, who is a graduate of the University of Wyoming, was previously director of the Wyoming Game and Fish Department. He has been employed in the Denver office of the Forest Service as fishery management biologist since June 1959.

### Heads Extension Section

Robert G. Wingard, for nine years head of Pennsylvania State University extension wildlife program, has been named chairman of a new extension section combining forestry and wildlife management.

His appointment to the new position was announced by Dr. H. R. Albrecht, extension director.

Wingard graduated from Pennsylvania State where he received a B.S. degree in forestry and a Master in forest wildlife.

After two years as project leader in wildlife research with the West Virginia Conservation Commission, he was named to the University staff in 1952. As extension wildlife specialist he developed a wildlife management program that has won the endorsement of farmers, sportsmen's groups, and public officials.

### W. A. Campbell Transfers to New Research Lab

Dr. William A. Campbell, who has since 1954 been center leader in charge of U. S. Forest Service research work at Athens, Ga., has been promoted and transferred to the new disease and insect laboratory under construction at North Carolina's Research Triangle. Joseph Pechanec, director of the Southeastern Forest Experiment Station, Asheville, announced that Campbell's transfer as senior research officer at the Station's Research Triangle installation would be effective in early July. Dr. Campbell will be carrying on fundamental studies of disease problems in the area and planning new programs of disease research to be pursued when the new laboratory is finished next year.

Dr. Campbell holds a B.S. from the State Teachers College at Mansfield, Pa., and an M.A. from the University of Colorado. In 1936 he entered the field of forest disease research with the U. S. Department of Agriculture after receiving his Ph.D. in plant pathology at Pennsylvania State University.

### Recreation Research Leader Named

Dr. L. D. Love has been selected as project leader in recreation research for the Rocky Mountain Forest and Range Experiment Station.

According to Director Raymond Price, the newly created position will deal with problems in outdoor recreation throughout the Station's 9-state research area as a part of the Forest Service's multiple-use policy.

Since 1953 Dr. Love has been in charge of research at the Fraser and Manitou Experimental Forests in the Front Ranges of Colorado.

He received his B.S. degree in forestry from Colorado State University in 1930, his Master degree from North Dakota Agricultural College in 1931, and his Ph.D. from the University of Arizona in 1934.

He worked for the Soil Conservation Service for 14 years before transferring to the Rocky Mountain Station in 1948 as chief of watershed management research.

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## Allied

### Soil Conservation Society of America Meets

At its 16th annual meeting, held at Purdue University July 30 to August 2, the Soil Conservation Society of America announced the election of R. D. Hockensmith as the next president of the organization. Mr. Hockensmith is director of soil survey operations of the Soil Conservation Service, USDA, Washington, D. C. He succeeds Walter C. Gumbel, Fairmont, W. Va., as president.

Among other honors bestowed at the Society's meeting, James K. Vessey, regional forester of the USFS at Atlanta, Ga., was cited for his activities on behalf of the work of the Society, of which he was made a Fellow in 1957, and Herman E. Baggenstoss of Tracy City, Tenn., was named an Honorary Member. Mr. Baggenstoss is currently president of the Forest Farmers Association and editor and publisher of *The Grundy County Herald*. He is widely known for his journalistic efforts on behalf of conservation.

### FPRS Officers Announced

Donald K. Saunders, president and chairman of the board of Saunders Brothers, Westbrook, Me., was elected president of the Forest Products Research Society at its 15th annual meeting held June 18-22 at Louisville, Ky.

Saunders succeeded R. H. Berry, vice president and general manager of the Scott Lumber Company, Burney, Calif., who still remains on the board for a year as past president.

T. S. Veazey, the Anaconda Company, Bonner, Mont., was elected president-elect for the forthcoming year. F. E. Dickinson, director of the University of California Forest Products Laboratory, was elected vice president of the Society.

More than 500 were in attendance at the four-day annual meeting. The 1962 annual meeting will be held at Spokane, Wash., June 24-28.

### Texas Forestry Association to Meet

Tom Anderson, president and publisher, Farm and Ranch Publishing Co., Nashville, Tenn., will be the principal speaker at the 47th annual meeting of the Texas Forestry Association in the Fredonia Hotel, Nacogdoches, October 20, 1961.

Other prominent speakers on the program include J. E. McCaffrey, vice president, International Paper Co.,


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## Schools

### 17th Yale Industrial Seminar

The College of Forestry of the University of Washington will cooperate with the Yale University School of Forestry in presenting the Seventeenth Yale Industrial Forestry Seminar at Seattle during the week October 23-27, 1961.

The Seminar will be on the topic "Financial Management of Large Forest Ownerships" and each of the five days will be devoted to a discussion of some phase of this topic under outstanding leaders in the field. Two of these men are Robert V. Hansberger, president of Boise Cascade Corporation, and John Fedkiw, forest economist at the Pacific Northwest Forest Experiment Station.

Enrollment in the Seminar is limited to twenty men whose experience will qualify them for participation.

For additional information write to: Professor Z. W. White, Yale School of Forestry, 205 Prospect Street, New Haven 11, Conn. *or* Dean Gordon D. Marckworth, College of Forestry, University of Washington, Seattle 5, Wash.

### Forest Research Center Joins Oregon State University

The Oregon Forest Research Center, an independent state organization, became part of Oregon State University on July 1, according to R. M. Kallander, administrator of the Center.

The move, aimed at increasing usefulness of the Center to the forest industries in Oregon, was approved by the state legislature and Governor Hatfield during the last session. Recommendation of forest industry advisers that the Research Center come under the auspices of the State Board of Higher Education arose from findings of a survey made to evaluate the program. The survey showed that Oregon had an outstanding program of research in forest management and products, and that major contributions had been made to the industry.

The Forest Research Center, which becomes the Forest Research Laboratory in the Agriculture Experiment Station, will benefit through increased opportunity to use facilities of OSU and through likelihood of obtaining research grants not previously available because the Center has not been connected with an educational institution.

The School of Forestry and the Research Center will gain mutually from the union, since the two separate programs of forest research of these agencies will be merged for increased efficiency, and opportunity to use facilities of the Center in teaching programs of the School will strengthen graduate work in forestry while broadening experience of the research staff. Completion of a federal laboratory at OSU for basic study of forest insects and disease will lead to cooperation of mutual value, also.

### Penn State University Appointments

Peter W. Fletcher, Forestry School director at Pennsylvania State University, has announced the following additions to the teaching staff:

Dr. George Tsoumis, assistant professor in wood technology, with graduate degrees from the University of Michigan and Yale University, effective July 1, 1961, replacing Dr. Richard N. Jorgensen, who has accepted a position in wood products extension at Michigan State University.

Dr. Sanford D. Schemnitz, assistant professor in wildlife management, with graduate degrees from the University of Florida and Oklahoma State University, effective July 1, 1961, replacing Professor Peter E. Dress, who has accepted a position at Purdue University while he continues graduate work in mathematics and statistics.

### Pulp and Paper Foundation Scholarship at NC State

The Scholarship Committee of the Pulp and Paper Foundation, Inc., has awarded 55 scholarships with an ag-

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gregate value of $32,175 to students in the School of Forestry at North Carolina State College.

In announcing the awards, Prof. R. G. Hitchings, acting head of the college's pulp and paper technology program, said 22 scholarships went to new freshmen who will enroll in the pulp and paper technology curriculum in September and 33 scholarships for upperclassmen in the curriculum were renewed.

The first award scholarships to new freshmen, which range in annual value from $300 to $750 each, totaled $11,750.

The chairman of the Pulp and Paper Foundation's Scholarship Committee, Dr. H. Y. Charbonnier of the Union Bag-Camp Corporation, Savannah, Ga., said that all states of the Southeast except one are represented by scholarship recipients.

## Hosner Appointed to VPI Post

Dr. John F. Hosner, Southern Illinois University associate professor of forestry, was appointed chairman of the Forestry Department at Virginia Polytechnic Institute, Blacksburg, Va., effective August 1. He has been a forestry teacher in the SIU School of Agriculture since 1950.

Hosner, a native of Gillepsie, Ill., is a graduate of Michigan State University, and obtained his doctorate at the State University College of Forestry at Syracuse University.

## Grant for Forest Tree Improvement Is Renewed

A second five-year grant of $25,000 from the Charles K. Blandin Foundation of Grand Rapids, Minn., was recently received by the University of Minnesota School of Forestry.

The grant is designated to support research in forest tree improvement studies during the period 1960-1965.

The School of Forestry's tree improvement project was initiated in 1955. Studies in this area are designed to accumulate information on genetic diversity in native and exotic tree species and isolate genetically improved strains for planting in Minnesota.

Major emphasis has been placed on the native conifers (especially white spruce, black spruce, and jack pine) and the aspens or popples and birches.

Cooperation in the projects supported by the Blandin Foundation is provided chiefly by the University's North Central School and Experiment Station, the Blandin Nursery, and the Lake States Forest Experiment Station at Grand Rapids.

Plans for research during the period 1960-1965 will place emphasis on spruce improvement problems.

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## Forestry Employment

**S.A.F. members are privileged to insert one 60-word advertisement in this column without charge. Forest industries desiring to employ foresters may insert advertisements at the rate of $4 per column inch. Copy must be received by the end of this month for an advertisement to appear in the issue after next.**

**Obviously the Society cannot assume responsibility beyond making it possible for prospective employee and employer to enter into negotiations.**

## Positions Available

Applications will be accepted, until October 1, for position of Area Forester in the State of Alaska. Applicants must possess a *minimum* of six years of successful and progressive experience in forest managment and forest protection including at least two years of supervisory and administrative experience either in private industry or public agencies. The Area Forester will be the head of the Anchorage Field Office Unit and will be administratively and technically responsible for all functions of Forestry, Parks & Recreation in the Anchorage area. Entrance salary will be at the rate of $9,840 per annum.
**Contact the State Forester, 344 Sixth Avenue, Anchorage, Alaska, for official announcement and application blanks.**

*Forest Engineer Wanted*—To serve as Secretary to Appalachian Technical Committee, and assist in New York City office. Field work on one week and some two week trips involves 40 to 50% of total time. B.S. in Forestry and some logging or wood procurement experience required. Ability to write and speak clearly is essential.
**If interested write for Job Specifications to W. S. Bromley, American Pulpwood Association, 220 E. 42nd Street, New York 17, N. Y.**

Permanent position for graduate forester experienced in timber cruising and appraisal, surveying, scaling, land management and logging for progressive small paper mill operation in the northeast. Must be able to speak and read French. Salary open. Please forward complete personal history and photograph to:
**Box Z, Society of American Foresters, 425 Mills Building, Washington 6, D. C.**

## Positions Wanted

B.C. Registered Forester, B.S.F., University of British Columbia, 1952. Age 37, married, veteran. Experience: Nine years in tropical, sub-tropical forests of South East Asia and temperate forests of North America, from pulp operations to heavy logging in Pacific Northwest; Eight years with international consulting firm, over a year in silviculture and extraction of pulp in Ontario and Alberta; Reports, forest inventories, management plans and special projects connected with hydro-electric developments, watershed management, silviculture, reforestation. Desire position in multiple-use forestry, public relations, forest education, or public recreational planning.
**Box Q, Society of American Foresters, 425 Mills Building, Washington 6, D. C.**

Forester, B.S.F., Arkansas A&M College, 1959. Age 28, single, veteran. Experience: Two summers, U.S. Forest Service as Engineers Aid and T.S.I. crewman; past 2½ years with private industry doing wide variety of forest management work including surveying, timber sales, acquisition, reforestation and administrative tasks. Desire position in bottomland hardwood region with opportunity for responsibility and advancement.
**Box R, Society of American Foresters, 425 Mills Building, Washington 6, D. C.**

B.S. & M.S. Forest Management, Purdue University 1961. Age 24, married, 2 children. Graduate work included courses in forest management, industrial management, continuous forest inventory, IBM methods, statistics, linear programming, and aerial photo interpretation.
**Box S, Society of American Foresters, 425 Mills Building, Washington 6, D. C.**

Eight years work in a wide variety of forestry activities, BSF, Mich. State 1951, married, 4 children. Experienced in timber management, logging, milling, lumber grading; manage evergreen seedling nursery, reforestation, all phases Christmas tree production. Presently employed, desire to relocate. Will consider any part of U.S. in field experience limited to Lake States.
**Box T, Society of American Foresters, 425 Mills Building, Washington 6, D. C.**

B.S. Forest Management, N.C. State College, 1961. AAS in Forestry, Paul Smith's College, 1959. Age 26, married, 1 child, veteran. Experience as undergraduate doing T.S.I. work in Adirondacks. Presently leader of T.S.I. crew at same location. Desire position in northeast offering practical experience in all phases Forest Management. References, resume sent on request. Available for interviews.
**Box U, Society of American Foresters, 425 Mills Building, Washington 6, D. C.**

B.S. in Forestry, Pa. State University, 1961. Age 22, married. Experience: 1 summer with U.S. Forest Service, Routt National Forest. Desire position in forestry or related field; any location.
**Box V, Society of American Foresters, 425 Mills Building, Washington 6, D. C.**

YOU CAN CUT COSTLY FIELDWORK by employing this graduate forester who has cost-cutting experiences with Field Liaison, Coordination, and Graphic Presentations in related fields of: Forest Management, Aerial Photograph Interpretation, Park and Recreation Facilities, Land Use Surveys, and Urban and Rural Planning. Prefer position with some public relations through lectures, teaching, and graphic arts. May I send you my portfolio?
**Box W, Society of American Foresters, 425 Mills Building, Washington 6, D. C.**

Forester, B.S. U.P.I. 1951. 9 years experience in Southern lumber industry. Would relocate in Southeast with private consulting firm or progressive lumber company.
**Box X, Society of American Foresters, 425 Mills Building, Washington 6, D. C.**

Forester, B.S.F., University of New Hampshire, 1961. Age 29, married, 1 cthild. Desire position with consulting firm or private industry. Employed by public agency since February 1961. Experience includes reforestation, scaling, cruising, and rodent control, plus 1 summer with U.S. Fish and Wildlife Service assisting in pond surveys.
**Box Y, Society of American Foresters, 425 Mills Building, Washington 6, D. C.**

# Combined Annual Meeting

## Canadian Institute of Forestry and Society of American Foresters

## Minneapolis, Minn., October 8-11, 1961

Visitor guide to points of interest for Iowa, Michigan, Minnesota, Wisconsin, North and South Dakota, Northwestern Ontario, and Southeastern Manitoba

### Iowa

1. Amana. Amana colonies, collective farming and wood-using industries, white pine plantations growing 656 bd. ft. per acre per year, hardwood timber stands under management.
2. Ames. Iowa State University Department of Forestry, forest nursery, oak wilt research.
3. Des Moines. Headquarters, Iowa Conservation Department.
4. Dubuque. Large millwork plants. Allied Chemical and Dye Corp. Barrett Division wallboard mill.
5. Forest City. Pilot Knob State Park.
6. Fort Madison. Crandon Paper Mills, Inc. mill. Cooperative state-industry forestry program.
7. McGregor. Yellow River State Forest; oak, hickory, basswood. State operated sawmill; Indian Mounds.
8. Strawberry Point. Backbone State Park and State Forest; scenic area.
9. Tama. Tama Indian Reservation, coniferous plantations.

### Michigan

#### Lower Peninsula

1. Alpena. Abitibi Corp. board mill.
2. Ann Arbor. University of Michigan School of Natural Resources.
3. Allegan. Allegan State Forest and Swan Creek Wildlife Experiment Station.
4. Cadillac. Headquarters, Manistee and Huron National Forests. Lake States Forest Experiment Station Lower Peninsula Experimental Forest.
5. Cheboygan. Charmin Paper Company mill.
6. Detroit. Scott Paper Company mill.
7. Decatur. Russ Experimental Forest operated by Michigan State University.
8. East Tawas. Au Sable Forest Products Cooperative. Osmose-pressure treating plant. Famous lumberman's monument.
9. East Lansing. Michigan State University Department of Forestry; forest nursery. Lake States Forest Experiment Station East Lansing Field Station.
10. Filer City. Packaging Corporation of America mill.
11. Grand Rapids. Furniture manufacturing center; numerous companies and displays. American Seating Company. American Excelsior Company.
12. Grayline. Hartwick Pines State Park, virgin pine stand.
13. Lansing. State capitol. Headquarters, Michigan Department of Conservation and state forester. Rose Lake Wildlife Experiment Station.
14. Midland. Dow Chemical Company, insecticides, fungicides, herbicides, preservatives. Plant tours available.
15. Muskegon. Central Paper Company.
16. Port Huron. Port Huron Paper Company mill.
17. Roscommon. State Forest Fire Experiment Station. Regional Conservation Department headquarters, conservation training school, forest nursery, early plantings, experimental forests. Pioneer Log Cabin Company.

#### Upper Peninsula

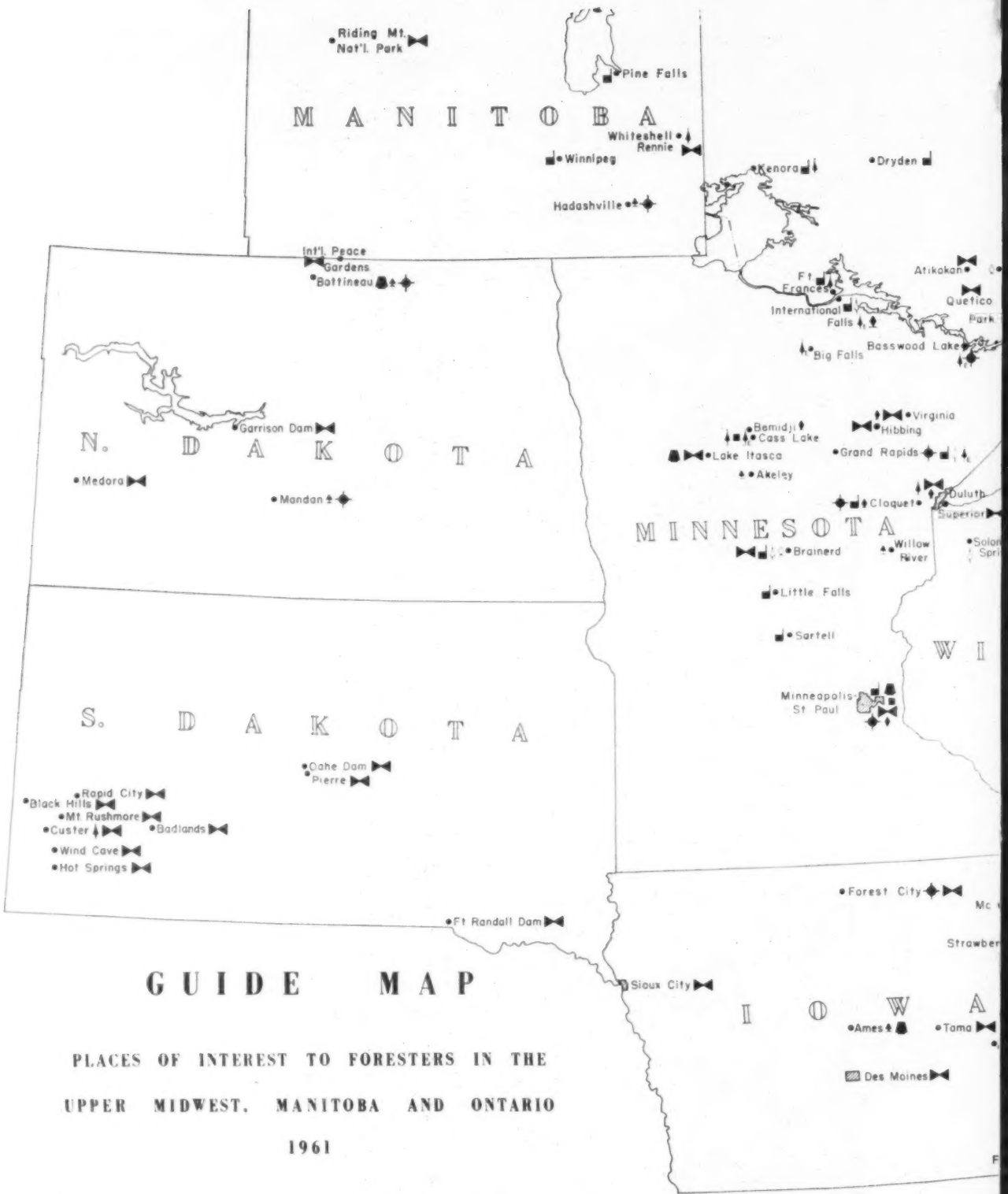
1. Brockway Mountain. Scenic drive.
2. Donken. Vulcan Corporation band mill; kilns; shoe lasts, bowling pins.
3. Dukes. Lake States Forest Experiment Station, Upper Peninsula Branch Experimental Forests.
4. Escanaba. Escanaba Paper Company mill; Birdeye Veneer Company; Headquarters Hiawatha and Marquette National Forests.
5. Gladstone. Northwestern Veneer and Plywood Company.
6. Houghton. Michigan College of Mining and Technology Department of Forestry.
7. Iron Mountain. Abbott Fox Lumber Company; sawmill at Mass and Trout Creek, Mich., managed timberlands. Kingsford Chemical Company. Headquarters Woodlands Department Kimberly-Clark Corp., at Norway, Mich. and mill at Niagara.
8. Ironwood. Headquarters Ottawa National Forest. Ahonen Lumber Company. Automated sawmill.
9. L'Anse. Celotex Corporation Wallboard mill. Industrial forest. Michigan College of Mining and Technology Experimental Forest.
10. Manistique. Manistique Pulp and Paper Company mill.
11. Marenisco. William Bonifas Lumber Company; extensive land holdings; selective logging; insect and disease research and control.
12. Marquette. Cliffs-Down Chemical Company; charcoal, wood distillation. Regional office, Michigan Department of Conservation. Ore shipping docks.
13. Munising. Munising Paper Company mill. Munising Wood Products Company; wooden bowls and specialties. Atlas Plywood Company. Pictured Rocks—Grand Island.
14. Negaunee. Cleveland Cliffs Iron Company; ore lands managed for timber production. Iron mines.
15. Newberry. Barrett Logging Company sawmill.
16. Ontanagon Huss-Ontanagon Paper Company mill.
17. Porcupine Mountains State Park. Beautiful Lake of Clouds.
18. Sault St. Marie—Michigan and Ontario. Famous Soo Locks. Cadillac-Soo Lumber Company band mill. Canadian Soo-Entomological Laboratory. Dunbar Forest Experiment Station, forest nursery. Michigan State University forestry summer camp and Abitibi Corporation Paper Mill.
19. Shingleton. Wildlife Experiment Station.
20. Tahquamenon Falls State Park. Largest falls in the Midwest.

### Minnesota

1. Akeley. Badoura State Nursery, Minnesota Department of Conservation.
2. Arrowhead Country. Wilderness area, world-famous canoe country.
3. Basswood Lake. Quetico-Superior Wilderness Research Center.
4. Bemidji. Indian Agency headquarters. Nu-Ply Corporation Veneer Mill.
5. Brainerd. Family resort country. Park Region Timber Company. Northwest Paper Company mill and industrial forest.
6. Cass Lake. Headquarters Chippewa National Forest. Wheeler Bridge and Lumber Company treating plant. Pike Bay Experimental Forest.
7. Cloquet. City of wood industry. University of Minnesota Forest Research Center. Northwest Paper Company, Diamond National Corporation, Wood Conversion Company, Weyerhaeuser Box Co. Scene of historic forest fire.
8. Duluth. Start of scenic Lake Superior North Shore circle route drive and headquarters Superior National Forest including boundary canoe area. Ore docks. Halvorson Trees, Christmas Tree producers. Headquarters Minnesota Timber Producer's Association. Western terminus Great Lakes St. Lawrence Seaway. Superwood Corporation board mill.
9. Grand Rapids. 60-year-old H. H. Chapman Norway Pine Plantation. Blandin Paper Company mill forest nursery. Lake States Forest Experiment Station experimental forests—Marcell, Grand Rapids Field Station, Pike Bay, Cutfoot Sioux. Division of Forestry central supply and repair depot.
10. Hibbing—Virginia. Mesabi Iron Range—world's largest open pit iron mines. Superwood Corporation board mill.
11. International Falls. Minnesota and Ontario Paper Company paper and wall board mills. Managed industrial forests and private experimental forest. Products research laboratory.
12. Lake Itasca. Itasca State Park, source of Mississippi River. University of Minnesota Forestry and Biological Station.
13. Little Falls. Hennepin Paper Company mill.
14. Sartell. St. Regis Paper Company.
15. St. Paul. State capitol. Waldorf Paper Products mill. School of Forestry and Lake States Forest Experiment Station on St. Paul Campus, University of Minnesota. Headquarters Minnesota Division of Forestry. J. H. Allison Forest Plantations. Forest History Society headquarters.
16. Willow River. General C. C. Andrews State Forest and nursery.

### Wisconsin

1. Appleton. Consolidated Water Power & Paper Company mill. Institute of Paper Chemistry, industry-financed paper research institution, operated in cooperation with Lawrence College.
2. Ashland. Terminus pulp rafting across Lake Superior.
3. Argonne. Argonne Experimental Forest, Lake States Forest Experiment Station.
4. Black River Falls. Central Wisconsin conservation area, forestry and wildlife management development. Wisconsin Conservation Department area headquarters.

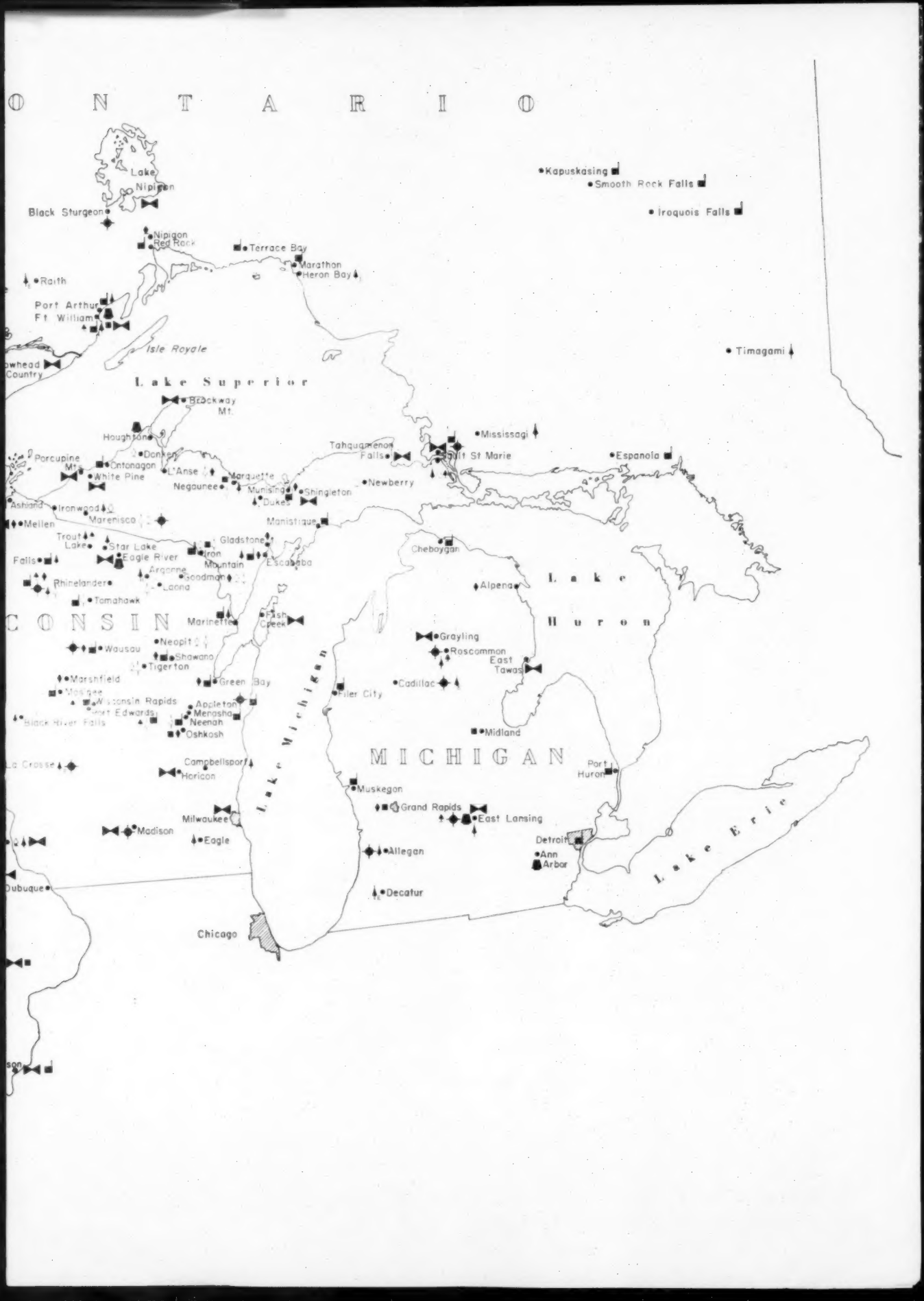



# GUIDE MAP

## PLACES OF INTEREST TO FORESTERS IN THE UPPER MIDWEST, MANITOBA AND ONTARIO

## 1961

| | |
|---|---|
| SAWMILL | EXPERIMENTAL FOREST |
| VENEER MILL OR BOARDMILL | NURSERY |
| PULP OR PAPER MILL | RESEARCH |
| SASH & DOOR, CHEMICAL | EDUCATIONAL |
| PUBLIC FOREST | MISCELLANEOUS (PARKS, ETC.) |
| PRIVATE FOREST | LOCATION OF POINT |


ONTARIO
Lake Nipigon
Black Sturgeon
Nipigon Red Rock
Terrace Bay
Marathon
Heron Bay
Raith
Port Arthur
Ft William
Isle Royale
Lake Superior
Brockway Mt.
Houghton
Porcupine Mts
Ontonagon
White Pine
L'Anse
Donkey
Marquette
Negaunee
Munising
Shingleton
Newberry
Tahquamenon Falls
Sault St Marie
Mississagi
Espanola
Kapuskasing
Smooth Rock Falls
Iroquois Falls
Timagami
Ashland
Ironwood
Mellen
Marenisco
Manistique
Trout Lake
Star Lake
Eagle River
Falls
Iron Mountain
Escanaba
Gladstone
Cheboygan
Argonne
Goodman
Laona
Rhinelander
Tomahawk
Alpena
Lake Huron
Marinette
Fish Creek
Grayling
Roscommon
East Tawas
Wausau
Neopit
Shawano
Tigerton
Marshfield
Green Bay
Cadillac
Filer City
Wisconsin Rapids
Appleton
Menasha
Neenah
Oshkosh
Midland
Lake Michigan
MICHIGAN
La Crosse
Campbellsport
Horicon
Port Huron
Muskegon
Grand Rapids
East Lansing
Milwaukee
Madison
Eagle
Detroit
Ann Arbor
Allegan
Lake Erie
Dubuque
Decatur
Chicago

5. Campbellsport. Northern Unit Kettle Moraine State Forest headquarters.
6. Eagle. Southern Unit Kettle Moraine State Forest, recreational forest.
7. Eagle River. Trees for Tomorrow Camp, private industry-financed forestry educational camp. Field and classroom instruction to school and adult groups. Headquarters of Trees For Tomorrow, Inc., located at Merrill, Wis.
8. Fish Creek. Peninsula State Park, outstanding scenic attraction on Green Bay, extensive recreational facilities.
9. Green Bay. Northern Paper Mills, groundwood and sulphite, extensively managed industrial forest located primarily in Upper Peninsula. Ft. Howard Paper Company, groundwood mill. Charmin Paper Company, sulphate and groundwood mill. Green Bay Pulp and Paper Company, semi-chemical mill. Nor Cor Veneer and Plywood Company.
10. Goodman. Goodman Lumber Company and industrial forest. Integrated forest industry, modern sawmill, veneer plant and dimension plant, utilization of waste material as chips. Outstanding managed northern hardwood and hemlock forest.
11. Horicon. Horicon Wildlife Area, nationally famous wildlife habitat restoration project.
12. LaCrosse. Lake States Forest Experiment Station field station and experimental forest.
13. Loana. Conner Lumber and Land Company, Wisconsin's largest sawmill, integrated forest industry, furniture plant, managed industrial forest.
14. Madison. Forest Products Laboratory. U. S. Forest Service, world famous wood products research center. Wisconsin Conservation Department headquarters. State capitol. University of Wisconsin, forestry research in genetics, soils, pathology, and entomology. Extension forester.
15. Marinette. Marinette County Forest. Outstanding managed county forest system. Marinette Paper Company.
16. Marshfield. Roddis Plywood Corporation, Wisconsin's largest manufacturer of hardwood plywood, doors, paneling, and other products.
17. Menasha. Marathon Corporation. paper mill and converting plant. Gilbert Paper Company. Wisconsin Tissue Mills. Menasha Woodenware Corporation.
18. Mellen. Penokee Veneer and Plywood Company, manufactures hardwood veneer and plywood. Copper Falls State Park.
19. Milwaukee. U. S. Forest Service Region 9 headquarters.
20. Mosinee. Mosinee Paper Mill.
21. Neenah. Kimberly-Clark Corporation headquarters and mill. (Also mill at Miagara, Mich.) Bergstrom Paper Company.
22. Neopit. Menominee Indian Forest and sawmill, nationally famous northern hardwood and hemlock forest under intensive management since 1908.
23. Oshkosh. Pluswood, Inc., manufacturers of hardwood veneer and plywood. Center of millwork industry, numerous companies. Headquarters, Northern Hemlock and Hardwood Manufacturers Association.
24. Park Falls. Headquarters, Chequamegon National Forest. Kansas City Star Company (Flambeau Paper Division) mill.
25. Port Edwards. Nekoosa-Edwards Paper Company mill and industrial forest. (Sulphate mill at nearby Nekoosa). Wisconsin's oldest industrial forest, company owned nursery.
26. Rhinelander. Headquarters, Nicolet National Forest. Wisconsin Conservation Department forest nursery. Rhinelander Paper Company, sulphite and semi-chemical, modern utilization of pulp wastes, managed industrial forests. Atlas Plywood Corporation, manufacturers of hardwood veneer and plywood. Consolidated Water Power & Paper Company forestry headquarters, experimental forest, and nursery. Lake States Forest Experiment Station field stations and genetics laboratory. Historical logging museum.
27. Shawano. Jolin Corporation and Webber Veneer & Plywood Company, manufacturers of hardwood veneer and plywood. Concentration of hardwood veneer and plywood plants in surrounding towns. Shawano Paper Mills.
28. Solon Springs. Mosinee Paper Company industrial forest, extensive coniferous plantations.
29. Star Lake. Star Lake plantation, outstanding 48-year-old red pine plantation growing 1,000 bd. ft. per acre per year; experimental thinnings.
30. Superior. World's largest iron ore docks. Miscellaneous wood-using industries.
31. Tigerton. Tigerton Lumber Company and industrial forest.
32. Tomahawk. Wisconsin Conservation Department forest protection headquarters and shop. National Container Corporation paper mill, large industrial forest development.
33. Trout Lake. Headquarters Northern Highland State Forest and state forest nursery.
34. Wausau. Wausau Paper Mills, located at Brokaw. Underwood Veneer Company, manufacturers of hardwood veneer and plywood. Marathon Corporation Paper mill located at Rothschild; carton plant; utilization of pulp waste materials in manufacture of by-products. Lake States Forest Experiment Station—Wausau Field Station.
35. Wisconsin Rapids. Consolidated Water Power and Paper Company mill. Headquarters of extensive industrial forest development. Wisconsin Conservation Department Griffith Nursery.

## North Dakota

1. Bottineau. Forestry School nursery. Lake States Forest Experiment Station, field station.
2. Mandan. Agriculture Research Service Northern Great Plains Field Station.
3. Medora. Theodore Roosevelt National Memorial Park—Petrified Forest.

## South Dakota

1. Badlands. National monument.
2. Custer. Headquarters Black Hills National Forest. Wind Cave National Monument.
3. Hot Springs. Hot springs.
4. Mt. Rushmore. National monument—carvings of Theodore Roosevelt, Washington, Lincoln, Jefferson.
5. Rapid City. Recreational area. Fossil museum.

## Northwestern Ontario

1. Atikokan. Iron mining development.
2. Black Sturgeon Falls. Field laboratory, forest entomology and pathology, branch Department of Agriculture.
3. Dryden. Dryden Paper Company.
4. Espanola. Kalamazoo Vegetable Parchment Company paper mill.
5. Fort Frances. Ontario-Minnesota Pulp and Paper Company, Ltd., paper mill. Regional and district headquarters Ontario Department of Lands and Forests.
6. Heron Bay. Cooperative woods regeneration research. University of Toronto and forest industries. Ontario Paper Company—pulpwood barking and loading.
7. Iroquois Falls. Abitibi Power and Paper Company paper mill.
8. Kapuskasing. Kimberly-Clark Corp. paper mill. Spruce Falls Power and Paper Company paper mill.
9. Kenora. Ontario-Minnesota Pulp and Paper Company, Ltd. District headquarters Ontario Department of Lands and Forests.
10. Lake Nipigon. Provincial forest and park recreational development.
11. Marathon. Marathon Paper Corporation of Canada, Ltd. paper mill.
12. Mississagi. Provincial forest.
13. Nipigon. Nipigon Plywoods Inc.
14. Port Arthur—Fort William. Abitibi Power and Paper Co. Ltd.; three paper mills. Great Lakes Paper Co. Ltd. paper mill. Ontario Department of Lands and Forests district headquarters and tree nursery at Rosslyn. Lakehead College of Arts, Sciences and Technology; forestry instruction. Northern Wood Preserves Ltd. Canadian terminus, St. Lawrence Seaway.
15. Quetico. Quetico Provincial Park.
16. Raith. Woods research laboratory of Abitibi Power and Paper Company.
17. Red Rock. St. Lawrence Corporation Ltd. paper mill.
18. Sapawe. J. A. Mathieu Lumber, Ltd.
19. Smooth Rock Falls. Abitibi Power and Paper Co. Ltd. paper mill.
20. Sioux Ste. Marie. Abitibi Power and Paper Co., Ltd. paper mill. Dominion entomological laboratory.
21. Timigami. Provincial forest.
22. Terrace Bay. Kimberly-Clark Corporation paper mill.

## Southeastern Manitoba

1. Hadashville. Manitoba Department of Mines and Natural Resources. Sandilands Forest Reserve; pineland tree nurseries, silvicultural research.
2. Pine Falls. Pine Falls Paper Co. Ltd. paper mill.
3. Rennie. Whiteshell Provincial Forest; recreational development.
4. Riding Mountain National Park.
5. Winnipeg. Building Products Ltd. board mill. Miscellaneous wood-using industries.

**Power-matching traction** enables the T-340 to bring king-sized loads to the landing in any terrain. Compact design and fingertip-easy planetary steering make it easy to dodge between trees and stumps that bigger power would have to detour.

# Logger's lugger!

## *More than 3 tons of pull with 47 hp* thrift*

**Dodging trees and stumps,** wading through track-deep muck, or climbing steep grades—working on every kind of terrain—International® T-340 crawlers are racking up production records amazing for a tractor under 50 hp. Power is balanced with extra built-in working weight to give excellent traction for maximum pull.

**Five-roller track frames** put over 67 inches of track on the ground for traction and stability. A broad selection of 10, 12, or 14-inch heavy-duty shoes enables you to match tractor flotation to ground conditions exactly.

**Five forward speeds** from 1.45 to 5.8 mph give you a broad range of load-matching gear ratios to put more than three tons of drawbar pull to work. At comparable speeds, the T-340 develops the greatest drawbar pull in its power class.

**Investment is much smaller** than for the next size larger crawler. Operating and upkeep costs are far lower.

**Get double duty** by skidding and loading with an International Drott T-340 Skid-Grapple. Pick up a half-cord of pulpwood (or similar weight of sawlogs) and lift to 9′ 10″ loading height. Top grab arm holds the load.

**Somewhere near you** an International T-340 is at work. Ask your IH dealer to introduce you to the owner. Better still, ask him to demonstrate a T-340 or the TD-340 Diesel crawler on your contract.

**Maximum engine hp at standard conditions.*

**INTERNATIONAL HARVESTER**

# Great New Saws

For top power, fast cutting speed, easy handling — and money-makin' dependability — you'll find that one of the new Homelite 707 chain saws is just right for you! New features include: an extra-husky, drop-forged crankshaft that stands up to the abuse of day-after-day production cutting; new pleated filter, with increased capacity and vertical design, that sheds sawdust and stays cleaner longer; new "on-off" switch grouped with other controls near throttle for easy finger-tip control; new fitted bolts in drive case that provide strong, reliable mounting for bar, regardless of length. Ask your dealer for a free demonstration — one of these new Homelite 707s has everything you need to make more money in production cutting.

**NEW 707G — EXTRA LUGGING POWER** The new 707G gear drive has the extra stamina you need for real money-makin' day-after-day production cutting. Increased cylinder displacement plus new, heavier crankshaft gives you more power-per-pound . . . more reliability than ever before. Perfectly balanced, the 707G weighs only 21 pounds, less bar and chain. Fells trees up to 7 feet in diameter. Choice of 2.8 or 3.5 to 1 gear ratio. Available with straight blades 16" to 60", brush cutter, 16" plunge-cut bow and clearing bar. Flush-cut or wrap-around handle.

**NEW 707D — POWER AND SPEED** Increased cylinder displacement and light weight give you more power per pound than ever in the new 707D. Add direct drive speed (ideal for limbing) and you have a quick cutting, easy-to-carry, easy-to-use money maker for pulpwood or saw log cutting. Only 19 pounds, less bar and chain. Fells trees up to 5 feet in diameter. Available with flush-cut or wrap-around handle, straight blades from 14" to 30" and 16" plunge-cut bow.

New Money-Makin' Accessories: Homelite "Perma-Hard Tip" bars — longest-wearing saw bars ever built . . . interchangeable on gear and direct drive models. Homelite alloy-steel chain — precision-hardened, tough, yet easy to file.

# HOMELITE

## The Money Makin' Saws

**HOMELITE** • A DIVISION OF TEXTRON INC.
4108 RIVERDALE AVE., PORT CHESTER, N. Y.
IN CANADA: TERRY MACHINERY CO. LTD.